REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

1929

SMITHSONIAN INSTITUTION
WASHINGTON
D. C.

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1929

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[1] In part governmentally supported.

THE SMITHSONIAN INSTITUTION

June 30, 1929

Presiding officer ex officio.—HERBERT HOOVER, President of the United States.
Chancellor.—WILLIAM HOWARD TAFT, Chief Justice of the United States.
Members of the Institution:

HERBERT HOOVER, President of the United States.
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ANDREW W. MELLON, Secretary of the Treasury.
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ROBERT P. LAMONT, Secretary of Commerce.
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JOSEPH T. ROBINSON, Member of the Senate.
CLAUDE A. SWANSON, Member of the Senate.
ALBERT JOHNSON, Member of the House of Representatives.
R. WALTON MOORE, Member of the House of Representatives.
WALTER H. NEWTON,[1] Member of the House of Representatives.
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IRWIN B. LAUGHLIN, citizen of Pennsylvania.
FREDERIC A. DELANO, citizen of Washington, D. C.
DWIGHT W. MORROW, citizen of New Jersey.
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Executive committee.—FREDERIC A. DELANO, R. WALTON MOORE, JOHN C. MERRIAM.
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Assistant Secretary.—ALEXANDER WETMORE.
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Editor.—WEBSTER P. TRUE.
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Appointment clerk.—JAMES G. TRAYLOR.
Property clerk.—JAMES H. HILL.

[1] Resigned June 30, 1929; Hon. Robert Luce appointed on July 1, 1929, to succeed him.

NATIONAL MUSEUM

Assistant Secretary (in charge).—Alexander Wetmore.
Administrative assistant to the Secretary.—William de C. Ravenel.
Head curators.—Walter Hough, Leonhard Stejneger, George P. Merrill.
Curators.—Paul Bartsch, Ray S. Bassler, Theodore T. Belote, Austin H. Clark, Frank W. Clarke, Frederick V. Coville, Charles W. Gilmore, Walter Hough, Leland O. Howard, Aleš Hrdlička, Neil M. Judd, Herbert W. Krieger, Frederick L. Lewton, George P. Merrill, Gerrit S. Miller, Jr., Carl W. Mitman, Waldo L. Schmitt, Leonhard Stejneger.
Associate curators.—John M. Aldrich, Chester G. Gilbert, Ellsworth P. Killip, William R. Maxon, Charles E. Resser, Charles W. Richmond, David White.
Chief of correspondence and documents.—Herbert S. Bryant.
Disbursing agent.—Nicholas W. Dorsey.
Superintendent of buildings and labor.—James S. Goldsmith.
Editor.—Marcus Benjamin.
Assistant Librarian.—Isabel L. Towner.
Photographer.—Arthur J. Olmsted.
Property clerk.—William A. Knowles.
Engineer.—Clayton R. Denmark.

NATIONAL GALLERY OF ART

Director.—William H. Holmes.

FREER GALLERY OF ART

Curator.—John Ellerton Lodge.
Associate curator.—Carl Whiting Bishop.
Assistant curator.—Grace Dunham Guest.
Associate.—Katharine Nash Rhoades.
Superintendent.—John Bundy.

BUREAU OF AMERICAN ETHNOLOGY

Chief.—Matthew W. Stirling.
Ethnologists.—John P. Harrington, John N. B. Hewitt, Francis La Flesche, Truman Michelson, John R. Swanton.
Archeologist.—Frank H. H. Roberts, Jr.
Editor.—Stanley Searles.
Librarian.—Ella Leary.
Illustrator.—De Lancey Gill.

INTERNATIONAL EXCHANGES

Secretary (in charge).—Charles G. Abbot.
Chief clerk.—Coates W. Shoemaker.

NATIONAL ZOOLOGICAL PARK

Director.—William M. Mann.
Assistant director.—Arthur B. Baker.

ASTROPHYSICAL OBSERVATORY

Director.—Charles G. Abbot.
Research assistant.—Frederick E. Fowle, Jr.
Research assistant.—Loyal B. Aldrich.

DIVISION OF RADIATION AND ORGANISMS

Research associate in charge.—Frederick S. Brackett.
Consulting plant physiologist.—Earl S. Johnston.
Research assistant.—Leland B. Clark.

REGIONAL BUREAU FOR THE UNITED STATES, INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE

Assistant in charge.—Leonard C. Gunnell

REPORT

OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

C. G. Abbot

FOR THE YEAR ENDING JUNE 30, 1929

To the Board of Regents of the Smithsonian Institution:

Gentlemen: I have the honor to submit herewith my report showing the activities and condition of the Smithsonian Institution and the Government bureaus under its administrative charge during the fiscal year ended June 30, 1929. The first 22 pages contain a summary account of the affairs of the Institution. Appendixes 1 to 11 give more detailed reports of the operations of the United States National Museum, the National Gallery of Art, the Freer Gallery of Art, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, the Division of Radiation and Organisms, the United States Regional Bureau of the International Catalogue of Scientific Literature, the Smithsonian library, and of the publications issued under the direction of the Institution; and Appendix 12 contains a list of subscribers up to November 15, 1929, to the James Smithson Memorial Edition of the Smithsonian Scientific Series.

THE SMITHSONIAN INSTITUTION

OUTSTANDING EVENTS OF THE YEAR

The year has been gratifyingly and unexpectedly rich in progress. Among many items of importance it is even hard to select the greatest. The National Government and many friends of the Institution have added materially to its income.—Mr. John Gellatly, of New York, has made the gift of his extensive collection comprising classic American and European paintings, outstanding specimens of jewellers' art, tapestries, furniture, and oriental art, valued altogether at several million dollars, to the Smithsonian for eventual exhibition in the National Gallery.—A new department, the Division of Radiation and Organisms, has been added to the research laboratories of

the Institution, and already has made notable headway under Dr. F. S. Brackett, its director, in its preparation to add fundamental data to our knowledge of the dependence on radiation of the growth of plants and the health of animals and human beings. In connection with this division, four rooms in the basement and four in the flag tower of the Smithsonian Building, heretofore of little value, have been fitted for laboratories and offices, and much modern laboratory furniture and apparatus have been purchased.—Four volumes of the 12-volume set entitled "Smithsonian Scientific Series" have been issued by the publishers in beautiful form. Many expressions of pleased appreciation have been received from subscribers, and the royalties to the Institution, as author, to be used for promoting research and publication, have exceeded anticipation. The remaining eight volumes of the series are far advanced in preparation, and will be at least equally as interesting and beautiful as those already issued.—Many expeditions of excellent accomplishment have gone forth from the National Museum, the Bureau of American Ethnology, the Astrophysical Observatory, and the Freer Gallery to remote quarters of the earth.—Numerous monographs and original research articles have been published, embodying valuable results of observation.—By cooperation with the War Department the military exhibits in the National Museum have been entirely rearranged. Along with this have gone other extensive improvements in the exhibitions.—Under the act of 1928, by which Congress appropriated $20,000 to promote cooperative investigations in ethnology and archeology in the several States to be expended at the discretion of the Smithsonian, allotments totaling over $9,000 have been made for projects in 10 different States.—Great progress has been made in the improvement of the library.—A new building for birds, believed to be the best for this purpose in the whole world, has been added to the equipment of the National Zoological Park. Congress has gratifyingly made provision for a new reptile house equally well designed.—All of these and many other matters of scarcely less interest will be mentioned in more detail in the pages which immediately follow, as well as in the special reports of the different branches of the Institution.

THE ESTABLISHMENT

The Smithsonian Institution was created by act of Congress in 1846, according to the terms of the will of James Smithson, of England, who, in 1826, bequeathed his property to the United States of America "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men." In receiving the property and accepting the trust, Congress determined that the Federal Government was

without authority to administer the trust directly, and therefore constituted an "establishment" whose statutory members are "the President, the Vice President, the Chief Justice, and the heads of the executive departments."

THE BOARD OF REGENTS

The affairs of the Institution are administered by a Board of Regents whose membership consists of "the Vice President, the Chief Justice, three members of the Senate, and three Members of the House of Representatives, together with six other persons other than Members of Congress, two of whom shall be resident in the city of Washington and the other four shall be inhabitants of some State, but no two of them the same State." One of the Regents is elected chancellor by the board; in the past the selection has fallen upon the Vice President or the Chief Justice; and a suitable person is chosen by the Regents as Secretary of the Institution, who is also secretary of the Board of Regents, and the executive officer directly in charge of the Institution's activities.

The only change occurring in the personnel of the board during the year was the termination of the Vice Presidency of General Dawes, and the succession of Charles Curtis, March 4, 1929.

The roll of the Regents at the close of the fiscal year was as follows: William H. Taft, Chief Justice of the United States, chancellor: Charles Curtis, Vice President of the United States; members from the Senate, Reed Smoot, Joseph T. Robinson, Claude A. Swanson; members from the House of Representatives, Albert Johnson, R. Walton Moore, Walter H. Newton;[1] citizen members, Robert S. Brookings, Missouri; Irwin B. Laughlin, Pennsylvania; Frederic A. Delano, Washington, D. C.; Dwight W. Morrow, New Jersey; Charles Evans Hughes, New York; and John C. Merriam, Washington, D. C.

FINANCES

The permanent investments of the Institution consist of the following:

Total endowment for general or specific purposes (exclusive of Freer funds)	$1,648,389.45
Itemized as follows:	
Deposited in the Treasury of the United States, as provided by law	1,000,000.00

[1] Resigned June 30, 1929; Hon. Robert Luce, of Massachusetts, appointed on July 1, 1929, to succeed him.

Deposited in the consolidated fund:

Miscellaneous securities, etc., either purchased or acquired by gift; cost or value at date acquired	$557,056.95
Springer, Frank, fund for researches, etc. (bonds)	30,000.00
Walcott, Charles D. and Mary Vaux, fund for researches, etc. (stocks)	11,520.00
Younger, Helen Walcott, fund (real-estate notes and stock held in trust)	49,812.50
Total	1,648,389.45

The invested funds of the Institution are described as follows:

Fund	United States Treasury	Consolidated fund	Separate funds	Total
Avery fund	$14,000.00	$48,678.65		$62,678.65
Bacon, Virginia Purdy, fund		65,494.44		65,494.44
Baird, Lucy H., fund		1,978.22		1,978.22
Canfield Collection fund		49,270.77		49,270.77
Casey, Thomas L., fund		3,212.83		3,212.83
Chamberlain fund		36,811.50		36,811.50
Endowment fund		61,427.74		61,427.74
Habel fund	500.00			500.00
Hachenberg fund		5,259.50		5,259.50
Hamilton fund	2,500.00	526.85		3,026.85
Henry, Caroline, fund		1,580.95		1,580.95
Hodgkins fund:				
General	116,000.00	39,204.10		155,204.10
Specific	100,000.00			100,000.00
Hughes, Bruce, fund		17,856.12		17,856.12
Myer, Catherine W, fund		20,672.33		20,672.33
Pell, Cornelia Livingston, fund		3,156.10		3,156.10
Poore, Lucy T. and George W., fund	26,670.00	29,220.73		55,890.73
Reid, Addison T., fund	11,000.00	11,569.23		22,569.23
Rhees fund	590.00	618.33		1,208.33
Roebling fund		157,758.93		157,758.93
Sanford, George H., fund	1,100.00	1,163.88		2,263.88
Smithson fund	727,640.00	1,595.75		729,235.75
Springer, Frank, fund			$30,000.00	30,000.00
Walcott, Charles D. and Mary Vaux, fund			11,520.00	11,520.00
Younger, Helen Walcott, fund			49,812.50	49,812.50
Total	1,000,000.00	557,056.95	91,332.50	1,648,389.45

The Institution gratefully acknowledges gifts from the following donors:

Dr. W. L. Abbott, for further contribution for archeological explorations in Dominican Republic and for expeditions to Haiti and Santo Domingo.

Mr. Francis B. Atkinson, for general endowment fund of the Institution.

Carnegie Corporation, for expenses of exhibition of Ranger paintings.

I. M. Casanowicz, estate of, for general endowment fund of the Institution.

Mrs. Laura Welsh Casey, further contribution to the Thomas Lincoln Casey fund, for researches in Coleoptera.

Hon. Charles G. Dawes, for search in Spain for valuable ancient documents.

Mr. Fairfax Harrison, for general endowment fund of the Institution.

Hon. Irwin B. Laughlin, for general endowment fund of the Institution.

Mr. Dean Mathey, for general endowment fund of the Institution.

Missouri Historical Society, for further studies of the language of the Osage Indians.

Research Corporation, further contribution for research in radiation.

Rockefeller Foundation, for research in radiation by Dr. Anders K. Ångström.

Mr. John A. Roebling, further contribution for researches in solar radiation and study of world weather records.

Stanco (Inc.), for botanical expedition to Peru.

Messrs. E. H. Siegler and C. H. Popenoe, for valuable patents covering insecticide.

Freer Gallery of Art.—The invested funds of the Freer bequest are classified as follows:

Court and grounds fund	$574,524.12
Court and grounds maintenance fund	148,112.53
Curator fund	596,301.18
Residuary legacy	3,917,116.19
Total	5,236,054.02

The practice of depositing on time in local trust companies and banks such revenues as may be spared temporarily has been continued during the past year, and interest on these deposits has amounted to $5,631.82.

Cash balances, receipts and disbursements during the fiscal year[2]

Cash balance on hand June 30, 1928		$238,369.41
Receipts:		
Cash from invested endowments and from miscellaneous sources for general use of the Institution	$61,309.56	
Cash for increase of endowments for specific use	3,000.00	
Cash for increase of endowments for general use	6,535.00	
Cash gifts for specific use (not to be invested)	50,111.01	
Cash received as royalties from sales of Smithsonian Scientific Series[3]	14,454.01	
Cash gain from sale, etc., of securities (to be invested)	22,944.95	
Cash income from endowments for specific use other than Freer endowment, and from miscellaneous sources	82,425.70	
Total receipts other than Freer endowment		240,780.23
Cash income from Freer endowment:		
Income from investments	282,435.13	
Gain from sale, etc., of securities (to be invested)	940,476.80	
		1,222,911.93
		1,702,061.57

[2] This statement does not include Government appropriations under the administrative charge of the Institution.

[3] Under resolution of the Board of Regents three-fourths of this income is credited to the permanent endowment fund of the Institution and one-fourth is made expendable for general purposes.

Disbursements:		
General work of the Institution:		
Buildings—care, repair, and alteration	$11,564.59	
Furniture and fixtures	746.06	
General administration [4]	20,652.66	
Library	3,006.55	
Publications (comprising preparation, printing, and distribution)	16,865.75	
Researches and explorations	13,707.11	
International Exchanges	7,921.67	
		74,464.39
Funds for specific use other than Freer endowment:		
Investments made from gifts, from gain from sales, etc., of securities, and from savings on income	51,860.45	
Other expenditures, consisting largely of research work, travel, increase and care of special collections, etc., from income of endowment funds and cash gifts for specific use	113,498.06	
		165,358.51
Freer endowment:		
Operating expenses of gallery, salaries, purchases of art objects, field expenses, etc	287,679.63	
Investments made from gain from sale, etc., of securities and from income	957,564.76	
		1,245,244.39
Balance June 30, 1929		216,994.28
		1,702,061.57

Recapitulation of receipts, exclusive of Freer funds

Cash balance on hand June 30, 1928		$238,369.41
Receipts:		
General uses—		
For addition to endowment	$25,254.99	
Reserved as income	64,923.06	
		90,178.05
Specific uses—		
Accretions to endowment	18,065.47	
Gifts for specific use (not to be invested)	50,111.01	
Cash income from endowments for addition to endowment	6,253.39	
Cash income from endowments and from other sources for conducting researches, explorations, etc	76,172.31	
		150,602.18
Total receipts, exclusive of Freer funds		240,780.23

[4] Includes salaries of secretary and certain others.

Statement of endowment funds

	General purposes	Specific purposes other than Freer endowment	Freer endowment
Endowment, June 30, 1928	$995,632.81	$598,668.69	$4,268,244.26
Increase from income, gifts, etc	21,347.69	8,742.89	5,671.62
Increase from gain from sales, etc	4,443.21	16,366.66	951,893.14
Increase from stock dividends	962.04	2,225.46	10,245.00
Endowment, June 30, 1929	1,022,385.75	626,003.70	5,236,054.02

The following appropriations were made by Congress for the Government bureaus under the administrative charge of the Smithsonian Institution for the fiscal year 1929:

Salaries and expenses		$32,500.00
International Exchanges		48,208.00
American Ethnology		60,300.00
Cooperative ethnological researches		20,000.00
International Catalogue of Scientific Literature		7,460.00
Astrophysical Observatory		33,200.00
National Museum:		
Furniture and fixtures	$29,560.00	
Heating and lighting	84,040.00	
Preservation of collections	502,546.00	
Building repairs	17,730.00	
Safeguarding dome of rotunda, Natural History Building[5]	80,000.00	
Books	2,000.00	
Postage	450.00	
		716,326.00
National Gallery of Art		31,168.00
National Zoological Park		182,050.00
National Zoological Park, building for birds		30,000.00
Printing and binding		95,000.00
Total		1,256,212.00

MATTERS OF GENERAL INTEREST

FINANCIAL

Several new features have been introduced by the treasurer, Mr. N. W. Dorsey, and by the executive committee of the Board of Regents in their financial reports. Returns from royalties on the Smithsonian Scientific Series appear for the first time. Reported for six months, only, these amount to nearly $15,000. The Regents have directed that one-fourth of all sums to be received from such royalties shall be treated as income, the remainder as endowment.

[5] Work done under direction of Supervising Architect and funds disbursed by U. S. Treasury.

It was felt that the immediate application of a quarter of these funds to research would better promote progress and attract greater interest among friends of the Institution than would the assignment of the entire proceeds of royalties to the permanent endowment of the Institution.

Tables have been prepared showing the condition and objects of the many special funds and showing the increases in general and special endowment from time to time during the history of the Smithsonian. Certain funds of fairly general application had been allowed to accumulate for a good many years. The chief of the Bureau of Ethnology having reported the critical emergency to ethnology which inheres in the imminent decease of the last surviving members of certain Indian tribes, the secretary directed that of the annual income of the said funds, an amount totaling about $3,500 should be devoted for several years to collecting this vanishing knowledge.

In accord with the recommendations of the Institution's financial advisers, Messrs. Scudder, Stevens, and Clark, of New York, and with the approval of the permanent committee of the Board of Regents, a considerable part of the endowment has been held for several years in the stocks of widely diversified and well-established companies and in short-term bonds. In this way the Institution has been able to share in the prosperity of our country and has enjoyed a considerable appreciation of its funds.

Especial mention is due the cooperation of the Research Corporation of New York, whose grants of funds have helped greatly to establish the new Division of Radiation and Organisms.

GIFT OF ART COLLECTION OF JOHN GELLATLY

The most important art collection to be received by the Institution since the Freer gift came during the year from Mr. John Gellatly, of New York City. The collection, valued at several million dollars, comprises more than 100 works of American art, some choice European paintings, and large collections of glass, jewels, tapestries, oriental specimens, and other valuable material, all provided with beautiful cases. Mr. Gellatly's offer was considered by the National Gallery of Art Commission and its acceptance highly recommended to the Smithsonian Regents. The Regents acted favorably upon the recommendation, and subsequently Congress passed the following joint resolution, approved by the President on June 6, 1929:

Whereas Mr. John Gellatly has offered to the Nation his art collection for eventual permanent exhibition in the National Gallery of Art under the administration of the Smithsonian Institution; and

Whereas the National Gallery of Art Commission has recommended to the Board of Regents of the Smithsonian Institution the acceptance of this collection on account of its high merit; and

Whereas the said Board of Regents have approved in principle this recommendation: Therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Smithsonian Institution is requested to convey suitable acknowledgment to the donor, and is authorized to include in its estimates of appropriations such sums as may be needful for the preservation and maintenance of the collection.

By the terms of the deed of gift the collection is the property of the Smithsonian Institution in trust for exhibition in the National Gallery of Art. It will remain in the Heckscher Building in New York City, where it is now housed, for four years. It is hoped that by the end of that period the National Gallery of Art will have a suitable building and the collection can then be transferred to Washington.

DIVISION OF RADIATION AND ORGANISMS

In the early history of the Smithsonian Institution its operations were well rounded. The natural history sciences and the physical sciences shared nearly equally in its work. Of late years only in the Astrophysical Observatory, and to a minor extent in chemical investigations in the Department of Geology of the National Museum, have the physical sciences been represented in the Institution's researches. However, the work of the Astrophysical Observatory has developed a body of experience in the measurement of radiation and of heat, and a collection of large pieces of optical apparatus, which, combined, comprise a unique preparation for research on the relations of radiation to life.

It is therefore with unusual satisfaction that I record the establishment on May 1, 1929, of the Division of Radiation and Organisms.

The staff is at present composed of Dr. F. S. Brackett, research associate in charge; Dr. E. S. Johnston, consulting plant physiologist; Mr. L. B. Clark, research assistant; and Miss V. P. Stanley, stenographer and laboratory assistant. With these cooperate the staff of the Astrophysical Observatory. Offices have been made available by remodeling the flag tower of the Smithsonian Building and installing an elevator, and laboratories are being constructed and equipped in the basement. These include plant-growth chambers, spectrograph and photometer rooms, a physical laboratory accommodating infrared spectroscopes, a chemical laboratory, and a glass-blowing room. At the close of the year work was nearly completed on the preparation of these laboratories and general equipment and special apparatus were being arranged for.

Investigations upon living organisms will at first be confined to the growth of plants under rigidly controlled physical and chemical conditions, the control extending to soil, gases, temperature, humidity, and intensity and color of light. General biological problems will be attacked through spectroscopic investigations of the complicated molecules which are a part of living organisms; that is, a study of the radiation arising from the internal vibrations of the molecules themselves. The work will be done in close cooperation with the Fixed Nitrogen Laboratory of the Department of Agriculture, as well as with men of diverse training in the biological sciences, so that modern specialization may be taken advantage of in these studies on the border line of several sciences.

EXPLORATIONS AND FIELD WORK

The field expeditions sent out under the administration or cooperation of the Institution as an important part of its program in the increase of knowledge numbered 29 during the year. They pertained chiefly to anthropology, geology, biology, and astrophysics, and many thousands of specimens and much valuable information resulted from them. Preliminary illustrated accounts of the work appeared in the annual exploration pamphlet issued by the Institution, and brief notices of many of the expeditions will be found in the reports of certain of the bureaus under Smithsonian direction, appended hereto. The Institution is able to bear the expense of but a very small proportion of the explorations, the rest being supported by cooperative arrangements with other governmental and scientific establishments and private individuals.

The year's expeditions visited such widely scattered regions as China, Alaska, Canada, Labrador, Haiti, Cuba, Honduras, various European countries, the Anglo-Egyptian Sudan, and the Philippines, besides 15 States in this country. Among the more extended expeditions may be mentioned Dr. Paul Bartsch's molluscan work in Cuba; investigations of the ancient Eskimo culture of northwestern Alaska, by Dr. A. Hrdlička and Mr. Henry B. Collins, jr.; the joint zoological and archeological expedition of Messrs. Miller and Krieger to the Dominican Republic and Mr. Arthur J. Poole's exploration of Haitian caves; the zoological collecting of the Rev. David C. Graham and the Freer Gallery's archeological work under Mr. Carl W. Bishop in China; and the botanical explorations in Honduras by Mr. Paul C. Standley.

COOPERATIVE ETHNOLOGICAL AND ARCHEOLOGICAL INVESTIGATIONS

As stated in my last report, Congress in 1928 passed an act authorizing the appropriation of $20,000 for cooperative ethnological

and archeological investigations, the Secretary of the Smithsonian Institution being designated to pass upon the merit of the proposed work and to make available from the money so appropriated a sum equal to that provided by any State, educational institution, or scientific organization in the United States, such sum not to exceed $2,000 in any one State in any one year. The direction of the work and the division of the result thereof was also placed under the Secretary of the Smithsonian. During the past year 16 allotments for cooperative projects have been approved as follows:

1928

June 19. State archeologist of Tennessee, to conduct archeological investigations in the Great Smoky Mountains, $500.

July 16. Indiana Historical Bureau, to make an archeological survey of the southeast portion of the State of Indiana, together with the excavation of a typical mound, $900.

Nov. 12. Oklahoma Historical Society, for excavation of a group of mounds of the true Mound Builder type in the northern part of Le Flore County, Okla., $1,000.

Nov. 20. University of California, to conduct ethnological investigations among the Yuma and Kamia Indians of southern California, $200.

Nov. 20. University of California, to conduct ethnological investigations among the Yokuts and Western Mono of San Joaquin Valley and southern Sierra Nevada, $200.

Nov. 26. University of Chicago, to excavate a series of mounds near Quincy, Ill., $1,000.

Nov. 28. University of Washington, to make a study of the Lummi Indians near Bellingham, Wash., $100.

1929

Apr. 12. University of California, for an investigation of the Nisenan or Southern Maidu of north central California, $300.

Apr. 12. University of California, for an investigation of the culture of the Kawaiisu of south central California, $250.

Apr. 12. University of California, for an intensive study of the basketry art of the Indians of northwestern California, $250.

Apr. 12. University of Michigan, to conduct an archeological survey of Muskegon and Marquette River Valleys, $500.

June 12. Colorado State Historical Society, to conduct archeological reconnaissance and excavations in Montezuma County. Colo., $1,200.

June 12. Logan Museum (Beloit, Wis.), to conduct archeological excavations in supposed Arikara sites, $500.

June 12. San Diego Museum, to conduct archeological investigations and excavations in western San Diego County, Calif., $800.

June 12. Yale University, to conduct studies of Indian music, $500.

June 27. Indiana Historical Bureau, to continue archeological survey of the State of Indiana, $1,000.

PUBLICATIONS

Partly through its very extensive correspondence, but chiefly through its publications, the Institution carries on its program of diffusion of knowledge. All of its 11 distinct series are scientific in

character, except the catalogues of the National Gallery of Art. Two of its less technical publications, namely, the Smithsonian Annual Report and the annual Smithsonian Explorations and Field Work pamphlet, are intended primarily for the general reader who is interested in the progress of science. All of its publications are distributed free to a large list of libraries and scientific and educational institutions throughout the world. A limited number of copies of papers in the Miscellaneous Collections series are held for sale at cost price.

The Annual Reports of the Smithsonian Institution are perhaps its most widely known series. Printed each year as a general appendix to these reports is a selection of about 30 articles chosen from the periodical literature of the world or specially contributed to illustrate in a readable and authoritative manner the advances in all branches of science for the year. For example, in the report soon to be issued—that for 1928—the following three typical articles appear:

New Results on Cosmic Rays, by R. A. Millikan and G. H. Cameron.

The Controversy Over Human "Missing Links," by Gerrit S. Miller, jr.

Communication Among Insects, by N. E. McIndoo.

The Institution published during the past year a total of 128 volumes and pamphlets, and 197,573 copies of Smithsonian publications were distributed, including 26,709 volumes and separates of the Smithsonian Annual Reports, 31,121 volumes and separates of the Smithsonian Miscellaneous Collections, 3,773 Smithsonian Special Publications, 115,128 publications of the National Museum, and 20,112 publications of the Bureau of American Ethnology. More detailed information regarding the publications is given in the report of the editor of the Institution, Appendix 11.

SMITHSONIAN SCIENTIFIC SERIES

As a means of augmenting its income for researches and publications, the Institution entered into an agreement in 1928 with the Smithsonian Institution Series (Inc.) of New York to publish a set of 12 volumes to be known as the Smithsonian Scientific Series, under the editorship of the secretary. These volumes, prepared at the Institution, present in popular form, profusely illustrated, the scientific activities of the Smithsonian and the wealth of natural-history material in the National Museum and Zoological Park. The sale of the series is entirely in the hands of the New York publishers, the Institution appearing only in the capacity of author.

The first four volumes appeared during the year and were distributed to the subscribers to the James Smithson Memorial Edition

whose names will be found in Appendix 12. These volumes were as follows:

1. The Smithsonian Institution, by Webster Prentiss True.
2. The Sun and the Welfare of Man, by Charles Greeley Abbot.
3. Minerals from Earth and Sky. Part I, The Story of Meteorites, by George P. Merrill. Part II, Gems and Gem Minerals, by William F. Foshag.
4. The North American Indians. An account of the American Indians north of Mexico, compiled from the original sources, by Rose A. Palmer.

The remaining eight volumes are in press or well advanced in preparation and will be issued in course of the calendar year 1930.

LIBRARY

The Smithsonian library is made up of 10 divisional and 36 sectional libraries. The former include the Smithsonian deposit in the Library of Congress, which is the main library of the Institution, the Smithsonian office library, the Langley aeronautical library, and the seven libraries of the bureaus under direction of the Institution. The sectional libraries are smaller units maintained in the offices of members of the staff for use in connection with their work. The library as a whole comprises about 800,000 volumes, pamphlets, and charts. Accessions for the year included 7,244 volumes and 7,627 pamphlets and charts, a total of 14,871 items.

Three important changes took place in the library during the year: the library of the Bureau of American Ethnology, previously an independent library, was made a division of the Smithsonian library; a new divisional library was organized for the recently established Division of Radiation and Organisms of the Institution; and the technological library was made a part of the National Museum library.

The outstanding gift of the year was the Harriman Alaskan library, brought together by Dr. W. H. Dall and presented by Mrs. Edward H. Harriman. Other important gifts include 1,000 publications from Mr. Herbert A. Gill, 500 books and periodicals on photography from Mr. A. B. Stebbins, and 1,500 publications of the Philosophical Society of Washington from the society itself.

Items of notable progress in the reorganization of the library under the direction of the librarian will be found in Appendix 10.

GOVERNMENTALLY SUPPORTED BRANCHES

There have grown up under the initiative of the Smithsonian Institution and at large expense of its private funds numerous enterprises which have become public necessities. Of these seven, by direction of Congress, are still administered by the Institution, though almost entirely supported by governmental appropriations.

These are: The National Museum, the National Gallery of Art, the Bureau of American Ethnology, the National Zoological Park, the Bureau of International Exchanges, the Astrophysical Observatory, and the Regional Bureau of the International Catalogue of Scientific Literature. Besides these the Smithsonian administers the Freer Gallery of Art, the gift of Charles L. Freer to the Institution in trust for the American people.

NATIONAL MUSEUM

Of the governmental branches of the Institution the most important is the National Museum. On the one hand its exhibitions entertain and instruct visitors, young and old, from all parts of our country and the world. On the other it is the repository of an enormous number of specimens of fauna, flora, geology, mineralogy, history, ethnology, and archeology, representing not only the United States but other regions, including the great oceans. These collections in many instances can no longer be duplicated, owing to the changed conditions now existing. They form a rich basis for research, valuable both for utilities and for pure science. The duty also devolves on us of continuing explorations and collecting, especially where the conditions tend toward the early loss of opportunities now available. Only in this way can the interests of the future be protected.

The appropriations for the maintenance of the Museum totaled $748,024, an increase of $97,064 over the preceding year. A large part of this increase was provided for much-needed adjustment in the salaries of the Museum staff, including a revision of the schedules of the various grades and a one-rate increase for employees who had attained proper efficiency ratings. Although the effect of this increase in salaries was immediately apparent in improved morale, the Museum salary rates are still below the average for similar organizations in the Government service, and it is urgently hoped that provision may be made for a further one-rate advance. The question of additions to the personnel is of growing importance, as in several divisions there are no assistants in training to carry on the work when the older men are gone, and for certain collections of scientific material there is no specialist in charge. The acute housing needs of the Museum include additional wings on the Natural History Building to relieve the present overcrowded condition and a more adequate and modern building to replace the old Arts and Industries Building, constructed nearly 50 years ago and entirely unsuited to present requirements.

The collections have been increased during the year by the addition of 545,191 specimens, by far the largest part of these coming to the department of biology. Gifts to schools numbered 3,258

specimens, and 23,326 were sent out in exchange to other organizations and individuals. Loans to scientific workers totaled 33,723 specimens.

The department of anthropology received a large collection, gathered by Mr. H. B. Collins, jr., from islands off the coast of Alaska, of ivory and bone implements illustrative of Eskimo culture from very early times to the period of Russian exploration. A series of objects representing the ethnology of the Nigerian and Gold Coast in Africa was presented by Mr. C. C. Roberts and another from the region of the Belgian Kongo was given by the Rev. Ellen I. Burk.

In biology there was received the valuable collection of mammals, birds, and insects bequeathed by the late Col. Wirt Robinson, and large series of birds and plants obtained in hitherto unrepresented areas of western China by Dr. Joseph F. Rock, presented by the National Geographic Society. Through the continued work of Dr. David C. Graham large collections of biological material from western China were received, and Mr. E. C. Leonard collected large series of plants in Haiti through the financial assistance of Dr. W. L. Abbott. The division of mammals received a complete skeleton of an adult sperm whale, the gift of Mr. Ippei Yokayama, president of the Oriental Whaling Co. Nearly 200,000 land shells were collected in Cuba by Dr. Paul Bartsch, under the Walter Rathbone Bacon Traveling Scholarship.

In the department of geology a meteoric iron weighing 1,060 pounds, from New Mexico, was purchased through the Roebling Fund. The mineral collections were enriched under the same fund by the addition of a large mass of pegmatite from Maine, a nugget of platinum weighing 17.274 ounces from South America, and a cut gem of benitoite weighing 7.67 carats, the largest known cut stone of this material. Through the Chamberlain Fund a number of interesting specimens were added to the gem collection. Among additions to the fossil collections may be mentioned remains of dinosaurs of several species brought by Mr. C. W. Gilmore from Montana, and specimens of Pleistocene mammals collected by Doctor Gidley in Florida.

The arts and industries department received many valuable additions, including three early types of Winton automobiles, one of the engines of the Army airplane *Question Mark*, which remained in the air nearly seven days, and an exhibit illustrating the entire process of shoemaking by machinery. The most important accession in the division of history was a silk dress worn by Martha Washington, received as a permanent loan from Mrs. Morris Whitridge.

The usual large number of field expeditions were taken part in by the Museum; these will be found described briefly in the report on

the Museum, Appendix 1. Work on safeguarding the dome above the rotunda was completed on May 14, 1929, the work being performed under direction of the engineers in the office of the Supervising Architect, Treasury Department. The auditorium and lecture rooms were used during the year for 125 meetings, covering a wide range of scientific and other activities. Visitors to the Museum for the year totaled 1,929,625, a large increase over the previous year. Eight volumes and 61 smaller papers were published, and 115,128 copies of Museum publications were distributed during the year.

NATIONAL GALLERY OF ART

The outstanding event of the year was the gift by Mr. John Gellatly of his important art collection mentioned in detail elsewhere in this report. Other than this, but few accessions came to the gallery, owing to the complete exhaustion of available space and the fact that no provision has yet been made for the erection of a new building.

The eighth annual meeting of the gallery commission was held December 11, 1928. At a special meeting held in April, 1929, the commission recommended to the Smithsonian Regents the acceptance of the Gellatly collection. At this meeting also the chairman, Mr. Gari Melchers, announced that the Carnegie Corporation had granted $1,000 for the purpose of assembling the art works so far purchased under the Ranger fund for temporary exhibition in the National Gallery. It is intended to hold the exhibition during December, 1929.

Six special exhibitions were held in the gallery, including a group of four portraits by M. L. Theo Dubé; a collection of paintings of the Gothic cathedrals of France, by Pieter van Veen; an exhibit of early American miniatures, by Edward Greene Malbone; 42 water-color paintings of scenes and figure subjects in India, by William Spencer Bagdatopoulos; a collection of paintings of Arctic and Antarctic scenes and character studies by Frank Wilbert Stokes; and an exhibition of paintings and sculpture by American negro artists.

FREER GALLERY OF ART[6]

The year's additions to the collection by purchase include examples of early Persian and Egyptian bookbinding; Chinese bronzes; Syrian glass; Persian, Turkish, and Egyptian manuscripts; Chinese, Japanese, Indian, and Persian paintings; Chinese, Persian, and west Asian pottery; and Chinese silver.

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[6] The Government's expense in connection with the Freer Gallery of Art consists mainly in the care of the building and certain other custodial matters. Other expenses are paid from the Freer endowment funds.

The total attendance for the year was 116,303, of which number 2,101 came to the offices for general information, to study the building and methods, to see objects in storage, or for other purposes. Ten classes were given instruction in the study rooms and twelve groups were given docent service in the galleries.

Gratifying progress has been made in the work of the field service. Dr. C. Li, of the field staff, was given every assistance by the Chinese Government in carrying on important archeological excavations in the Province of Honan. Political conditions in China have improved steadily during the year, and it may be confidently expected that the Freer Gallery's work in the field may now be carried on without interruption of any kind.

BUREAU OF AMERICAN ETHNOLOGY

On August 1, 1928, Mr. Matthew W. Stirling assumed the office of chief of the bureau, succeeding Dr. J. Walter Fewkes, who retired earlier in the year.

The work of the bureau for the year covered widespread ethnological and archeological investigations relating to numerous Indian tribes. Mr. Stirling completed a survey of an interesting group of mounds in the vicinity of Tampa Bay, Fla., selecting a large mound at Palma Sola as a site for later intensive excavation. Doctor Swanton continued work on the Timucua dictionary, and Doctor Michelson renewed his researches among the Algonquian tribes of Oklahoma and the Fox Indians of Iowa. Mr. Harrington completed his report on the Taos of New Mexico and studied the Karuk of California. Doctor Roberts brought to completion his archeological work along the Piedra River in Colorado, uncovering 50 houses of the prehistoric Pueblo peoples, and prepared a report covering the investigation. Later in the year he began excavations at a site in eastern Arizona, revealing eight pit houses occupied by Basket Maker III and Pueblo I peoples. Mr. Hewitt continued his ethnological work among the Iroquois, and Doctor La Flesche revised the manuscript of his Osage dictionary. Miss Densmore studied the music of various tribes in Wisconsin.

The bureau published three annual reports, with accompanying papers, and five bulletins. A total of 20,112 bureau publications were distributed during the year.

INTERNATIONAL EXCHANGES

The number of packages of publications handled during the year was 620,485, a large increase over the number handled during the previous year. The total weight of the packages was 621,373 pounds, also an increase. These totals include both the packages sent abroad and those received for distribution in this country.

The total number of sets of United States governmental documents forwarded to foreign depositories remains at 105, but those sent to Latvia and Rumania have been increased from partial to full sets, and in several countries the location of the depository has been changed. The daily issue of the Congressional Record is now exchanged with 101 foreign establishments.

NATIONAL ZOOLOGICAL PARK

The total number of animals added to the collections during the year was 479, including an unusual number of gifts of valuable specimens, while 541 were lost through death, return of animals, and exchange, leaving the number on hand at the close of the year at 2,211. These represent 579 species of mammals, birds, reptiles, and batrachians. Because of the restrictions of exhibition space, no attempt has been made to enlarge the collection for the present, effort being concentrated on selecting through exchange and purchase only choice and especially desirable species. As a result, the collection is now unusually rich in rare and interesting forms.

The most spectacular addition of the year, and in fact of many years, was N'Gi, the gorilla purchased with money remaining from the Smithsonian-Chrysler expedition funds. On the first Sunday that he was shown at the park, despite the fact that it was a cold day, over 40,000 people came to see him. For the year the attendance reached a total of 2,528,710, a considerable increase over the preceding year. This total included 497 classes of students, aggregating 30,886 individuals.

Work on the exterior of the new bird house, built last year, was completed, including the construction of outdoor cages and the laying out of an attractive approach to the building. The roofs of several of the older buildings were repaired, and many of the bridle paths in the park were altered after consultation with those interested in riding.

Congress has appropriated $220,000 for the construction of a reptile house, which for years has been badly needed. In order to insure the best and most modern building for the exhibition of reptiles and batrachians, the Smithsonian Institution from its private funds sent the director of the park and Mr. A. L. Harris, municipal architect, to Europe to study the zoological parks of foreign cities. Twenty zoos were visited, and through the courtesy of those in charge many valuable ideas were obtained which will be used in the preliminary plans for the new reptile house.

Of the several additional buildings needed for the proper development of the National Zoo the most urgent is an exhibition building for apes, lemurs, and small mammals. For the small mammals, which include some of the most interesting of all animals, there are

at present practically no suitable quarters, and the great apes, of which the park has a valuble collection, are now so housed that it is often impossible for visitors to see them. Tentative plans for a modern, hygienic building to remedy this situation have been prepared, the estimated cost being $225,000.

ASTROPHYSICAL OBSERVATORY

The Smithsonian Astrophysical Observatory, through its field stations on Table Mountain, Calif., and Mount Montezuma, Chile, and the cooperating National Geographic Society station on Mount Brukkaros, South West Africa, has continued the exact measurement of the intensity of the radiation of the sun as it is at mean solar distance outside the earth's atmosphere. The California and the Chile observations, having reached definitive status, now concur within narrow limits in their determination of the sun's variation. The Montezuma values of the solar constant are published by the Weather Bureau on the Washington daily weather map.

Further investigations have apparently confirmed three definite periodicities previously noticed in the solar variation of approximately 11, 15, and 26 months.

At the Mount Wilson, Calif., station, Doctor Abbot and Mr. Freeman repeated with richer results the bolometric determination of positions of solar and terrestrial absorption lines and bands in the infra-red solar spectrum, which formed the main subject of Volume I of the Annals of the Astrophysical Observatory. Another research carried through at Mount Wilson was the observation of the distribution of energy in the spectra of 18 stars and of the planets Mars and Jupiter, accomplished by Doctor Abbot, with the aid of Doctor Adams, of the Mount Wilson Observatory, using the 100-inch telescope and a sensitive radiometer.

Preparation of the text of Volume V of the Annals, to contain the numerous observations since 1920, was begun during the year, and it is hoped that the volume will be ready for publication in the fiscal year 1931.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE

Publication of the International Catalogue was suspended in 1922 because of lack of financial support, but the United States bureau, conforming with an agreement made with other bureaus, has continued to keep records of current scientific periodicals and to do other necessary work in order that actual indexing may be resumed when reorganization of the catalogue becomes possible. Expenses have been kept at the absolute minimum consistent with maintaining the bureau intact.

The assistant in charge of the bureau has during the year drawn up a detailed plan whereby the work of the catalogue could be reorganized and publication resumed. The initial capital required under this plan would be $75,000 for equipping a printing plant and maintaining the central bureau for one year. After the first year the enterprise would again be self-supporting through the sale of the catalogue to subscribers. At the close of the past year the assistant in charge was in correspondence regarding the plan with Prof. Henry E. Armstrong, F. R. S., chairman of the executive committee, in whom the 1922 Brussels Convention vested authority to consider and propose plans for resuming publication.

NECROLOGY

ROBERT RIDGWAY

Robert Ridgway, curator of birds, died at Olney, Ill., March 25, 1929. He was born at Mount Carmel, Ill., July 2, 1850, and was early attracted to natural-history subjects. When a boy of 14 years he came to the attention of Professor Baird, who later secured for him the position of naturalist on the fortieth parallel survey under Clarence King. He went to San Francisco via Panama in May, 1867, and spent three years in the field. He prepared a report on the collections made by him, which was published in 1877. In the meantime, Professor Baird had projected a work on birds in conjunction with Dr. Thomas M. Brewer, and Mr. Ridgway was engaged to provide the technical descriptions. This work, the History of North American Birds, was published in three large volumes in 1874 and covered the land birds only. In 1884 the two volumes on water birds appeared, completing a memorable undertaking.

Mr. Ridgeway was employed at intervals by the Smithsonian Institution up to 1874, when he was designated as ornithologist, a position he held under varying titles to July 1, 1880, when he became curator of birds, and continued under this title until the date of his death. He was a very busy worker, devoted to his subject, and spent little time in recreation. His first published note appeared in the American Naturalist, in 1869, and from that date to the present his communications were frequent, amounting to well over 500 titles in all, exclusive of his more pretentious works. In 1886 he published a Nomenclature of Colors which was quickly adopted by naturalists and became the standard for descriptive work, to be replaced only by the same author's Color Standards and Color Nomenclature issued in 1912. In 1887 his Manual of North American Birds made its appearance, followed by a second edition in 1896.

For many years Mr. Ridgway had been collecting material and data for a technical treatise on the birds of North and Middle America, a work that Professor Baird had in mind years ago, and when authorized by the late Doctor Goode to produce such a work he was well prepared. From 1901 to 1919 eight parts of this work, Bulletin No. 50 of the United States National Museum, were issued, and he was engaged on the manuscript of the ninth and tenth parts at the time of his death.

In recognition of the quality of his work he received many honors from scientific societies both at home and abroad. Some years ago he was granted the Walker Grand Prize, issued by the Boston Society of Natural History, the Daniel Giraud Elliot gold medal, and the William Brewster medal and prize. He was a member or honorary member of various ornithological societies, the Zoological Society of London, the Manchester Literary and Philosophical Society, and others.

Mr. Ridgway was keenly interested in field work, and made many trips to various parts of Illinois and Indiana. He visited Florida in three successive years (1895–1897), accompanied the Harriman Alaska expedition in 1899, and made two collecting trips to Costa Rica, 1904 and 1908.

EUGENE AMANDUS SCHWARZ

Eugene Amandus Schwarz, custodian of coleoptera in the National Museum, died October 15, 1928. He was born in Liegnitz, Silesia, April 21, 1844, and came to America in 1872, taking up work with Hagen at Cambridge, Mass. In 1874 he accompanied his friend and pupil, H. G. Hubbard, to Detroit, where they founded the Detroit Scientific Association and started an entomological museum. In this year he spent several months collecting insects in Florida, the first of a long series of collecting expeditions that continued throughout his life. In 1878 he came to the Department of Agriculture, where he remained until his death. In 1898 he was appointed custodian of coleoptera in the National Museum, and here he introduced better standards of care and arrangement. Besides the extensive collection made by Hubbard and himself he secured for the Museum many other important collections, and he started and actively promoted the formation of a collection of coleoptera larvae, which has since grown to be probably the largest in the world.

Doctor Schwarz was very modest and self-effacing, but during the last 40 years his fame as a man of great learning slowly spread among the entomologists of this country until it became generally recognized. He always willingly placed his unlimited knowledge

and experience at the disposal of the younger generations. His bibliography contains nearly 400 titles, mainly on coleoptera.

HARRISON GRAY DYAR

Harrison Gray Dyar, custodian of lepidoptera in the National Museum, died January 21, 1929. Doctor Dyar was born in New York, February 14, 1866, and was educated at the Massachusetts Institute of Technology and Columbia University. He came to the Museum in 1897 and his term of service amounted, therefore, to more than 30 years. During nearly all of this time he was a volunteer and unpaid worker, but for a few years he was on the staff of the Bureau of Entomology.

Doctor Dyar was one of the authors of the large monograph of the mosquitoes of North America published nearly 20 years ago by the Carnegie Institution, and he continued from that time to be the principal specialist in the group in the western hemisphere. The monograph having been out of print for some time he completed quite recently a new work on the mosquitoes of both North and South America, which was published last year by the Carnegie Institution in one large volume. He gave much attention to the early stages of the mosquitoes, so that his classification covered these in a very unusual degree.

In 1917 Doctor Dyar gave to the Museum his entire collection of insects, numbering some 35,000 specimens. As a result of his labors the National Museum has one of the largest collections of mosquitoes in the world and probably by far the largest one in larval stages and in mounted specimens of genitalia.

JOHN DONNELL SMITH

John Donnell Smith, for many years honorary associate in botany, Smithsonian Institution, died December 2, 1928. Captain Smith was born in Baltimore June 5, 1829, and at the time of his death was the oldest living graduate of Yale University. Aside from distinguished service in the public welfare, his interest centered in the botany of Central America, in which field he was an acknowledged authority. In the course of his studies he had built up an extensive library and an herbarium of over 100,000 specimens, which were presented to the Smithsonian Institution several years ago. In the death of Captain Smith the world has lost a scientist of note and the Smithsonian Institution a distinguished friend and patron.

Respectfully submitted.

C. G. Abbot, *Secretary.*

APPENDIX 1

REPORT ON THE UNITED STATES NATIONAL MUSEUM

SIR: I have the honor to submit the following report on the condition and operations of the United States National Museum for the fiscal year ended June 30, 1929:

The total appropriations for the maintenance of the National Museum for this period amounted to $748,024, an increase of $97,064 over the appropriations for the year 1928. Of this increase it is gratifying to record that a large part was provided for much-needed adjustment in the salaries paid to the Museum staff. This adjustment came partly through the operation of the Welch Act regulating governmental salaries in general, under which there was a revision of the schedules of the various grades, and partly through allowance by the Congress of additional funds to permit a 1-rate increase under the provisions of the reclassification act for those employees who had attained the proper efficiency ratings. An increase of $3,000 provided for additional storage facilities for the steadily increasing study collections. The addition of three employees, namely, an engineer, a fireman, and an elevator conductor, required for the adequate operation of the heating and lighting plant and for the proper maintenance of elevator service, necessitated $3,840 more. There was added also the new position of assistant curator in the division of mammals, where assistance was urgently required. An allowance of $1,200 provided for the purchase of uniforms for guards and elevator conductors on day duty in our buildings. An increase of $4,610 under the item for building repairs covered an additional painter, the purchase of further paint materials, and allotment for replacement of cement work on the private roadways leading to the east service entrance of the Natural History Building. The sum of $500 was added to the appropriation for the purchase of books for the Museum libraries and $2,500 to the allotment for printing and binding for the Museum.

In the first deficiency act for the fiscal year 1928 there was provision of $80,000 for safeguarding the dome of the rotunda of the Natural History Building, the work to be performed under the direction and supervision of the Supervising Architect, Treasury Department, and the money to be available until June 30, 1929.

The increase in salaries has been most gratifying and has brought needed relief in economic situation for many Museum employees. The effect of this betterment has been immediate in increased morale in an organization whose employees have always been constantly devoted to its best interests. To consider this matter further, it may be pointed out that the reclassification act at present calls for advance in salary until the average salaries paid under the various grades reach the average fixed by law for these grades. At the present time the majority of Museum employees stand at the second salary rate in their respective grades, permitting an advance of one more step according to the provision of the reclassification act. As the salary rates are still below the average for similar organizations in the Government service, it is urgently desired that further provision for this 1-rate advance be made. The present moneys in the various appropriations above the salary roll do not permit these advances. Should this additional amount be made available the salary status under the different appropriations will be rendered more or less stable without necessity for further considerable increases in salary allotment under present circumstances. There will remain only the need of adjustment of classification in some instances and the additions of new personnel required in many cases. It is earnestly hoped that the promotions required may be made in the fiscal year 1931.

The question of further additions to personnel remains one of importance, as there is a growing necessity for further workers both on the scientific staff and on the clerical force. Relief has been obtained in some instances, particularly in two divisions where assistants have been provided for the older men now in charge, with the intention that they may be in training to carry on when the older members are gone. Several cases of this kind remain still to be cared for, and there are in addition certain collections for which the Museum now has no specialist in charge. At the present time it is necessary to employ for short periods temporary cataloguers, typists, and laborers to assist in the regular work. These persons should be available on the permanent staff, since the work is specialized and requires considerable training for adequate and proper performance. This training it is not possible to give during a period of temporary appointment.

In the annual report for last year attention was called to the necessity for further space to house the steadily growing collections which increase annually in spite of efforts to eliminate material that is not required for permanent preservation. The whole collection forms a valuable part of the riches of our National Government—a part that will increase steadily in value because each year more and more objects become impossible to duplicate through the destruction by

our advancing civilization of an increasing number of natural forms. Proper provision must be made to secure everything of importance obtainable while there is yet opportunity.

Needs for housing in the National Museum, as outlined last year, include additional wings on the Natural History Building to provide for relief from the present congestion, which in many cases is now acute. Of equal importance and necessity is more adequate provision for the collections in arts and industries at present housed in the old National Museum Building, which when constructed in 1881 was adequate for the needs of those days, but which is not designed in a manner commensurate with present requirements. This building should be replaced by another much larger structure that will provide proper housing for the objects in this collection. These have great importance to the American Nation as a record of industrial development, commerce, and engineering in all its lines. The series of Patent Office models alone, representing the basic principles from which our important economic advances have grown, is of itself of sufficient importance to warrant the proposed building. With these, coupled with related historic objects of all kinds drawn from other sources, it results that the national collections contain materials that can not be duplicated in any other museum of the kind in the country or in the world. With provision being made for industrial museums in other sections of the country we should prepare at once for more adequate housing for the national collections of this kind in Washington.

The collections of history at present are placed in part in the Natural History Building and in part in the building given over principally to arts and industries. The historical materials concern persons and events of supreme importance to our Nation, since they treat of the very birth, growth, and expansion of our country. As such they are of absorbing interest to every patriotic American and should be displayed to the fullest advantage. At the present time the limits of space are such that many interesting objects can not be placed on public display and it is necessary at times to decline materials that should be accepted, because of lack of proper facilities for their preservation.

Preparation of plans and other necessary arrangements for housing space will require considerable time. With our need now acute the preliminaries necessary before actual construction may be begun should not be postponed. The present interest of the public demands prompt action in these matters.

The steadily growing attendance in the Museum halls is in itself sufficient indication of the interest of the American public in the

National Museum and its collections. More adequate housing facilities can not but add to this interest and will assist in making Washington even more attractive to the hundreds of thousands of our countrymen who journey each year to visit the seat of government of our great Nation.

COLLECTIONS

Additions to the collections of the National Museum during the fiscal year have reached the large total of 545,191 separate objects, by far the greater part of these coming to the department of biology. This increment, while not quite equal to that of last year, is on a parity with that received in the last few years. The collections of the National Museum are now universally recognized as of such great value and importance as to draw to them donations of the most valuable kind in the form of collections gathered under private or other auspices which it is desired to place where they will have assurance of proper care and permanent preservation. Recognition that in the National Museum there may be found these conditions is highly gratifying. Material of various kinds sent for examination and report during the year amounted to 1,314 lots, including many thousands of separate things. Gifts to schools and other educational institutions included 3,258 specimens, while in exchange with other scientific organizations and individuals there were sent out 23,326 specimens, these being duplicate materials for which others were received in return. Loans of all kinds to scientific workers outside of Washington included 33,723 specimens, many of them highly valuable.

Following is a digest of the more important accessions for the year in the various departments and divisions of the Museum.

Anthropology.—An expedition under direction of Henry B. Collins, jr., to St. Lawrence Island in Bering Sea, including work on the islet of Punuk, brought the largest selection of historical-archeological materials ever obtained by the Museum in one season from the Bering Sea area. In it are found many hundreds of ivory and bone implements illustrative of the culture of the Eskimo from very early times down to the period of Russian exploration. The carvings shown are of three distinct types, indicating as many cultural stages in the development of the people who made them. The entire collection is one almost without parallel in our history and will be of great importance in elucidating the period of habitation at the village sites represented.

Among other valuable collections there has come a series representing the ethnology of the Nigerian and Gold Coast in Africa, the gift of C. C. Roberts. A further collection from Africa of considerable

importance in ethnology is one from the region of the Belgian Congo received as a gift from the Rev. Ellen I. Burk.

There was received also a number of miscellaneous materials secured by Dr. David C. Graham in connection with his work in western China, principally in the Province of Szechwan.

An exchange of specimens with A. S. Kenyon, of Melbourne, Australia, brought a miscellaneous collection of decorative art work on wood, stone, and shell, and in basketry, as well as stone and wooden message sticks and an assortment of throwing sticks, including decorated boomerangs.

Archeological materials include an old type of reed basket from a rock shelter in Russell County, Ky., secured by purchase; flint and stone implements and bone and copper beads presented by Mr. Charles Beckman, from various sites along the Columbia River in Washington; and a series of stone implements collected by Dr. Walter Hough, head curator, in the vicinity of Abilene, Tex. Among Old World specimens there may be mentioned a series of nearly 500 that come from the work of Dr. George Grant MacCurdy, director of the American School of Prehistoric Research, from localities in Dordogne, France, received as a loan from the Archæological Society of Washington. Skulls and skeletons of ancient Eskimo from the Collins collection on St. Lawrence Island form one of the most important additions to the division of physical anthropology in this department. There were received also 10 masks taken from living Labrador Eskimo, obtained in exchange from Prof. V. Suk, of the University of Brno, Moravia.

Biology.—Noteworthy among receipts in this department have been the highly valuable collections of mammals, birds, and insects left to the Museum by bequest by the late Col. Wirt Robinson, long a valued contributor to the Institution. There may be mentioned also large collections of birds and plants obtained by Dr. Joseph F. Rock in western China from areas previously unrepresented in our halls, which were received as a gift from the National Geographic Society, under whose auspices the field work was performed.

Excellent collections from western China in many branches of biology, principally in birds, mammals, insects, crustaceans, and fishes, were obtained through the continued efforts of Dr. David C. Graham, who has long been a resident in the Province of Szechwan, and who has been most assiduous in obtaining representatives of the fauna in that area for the National Museum. From farther south, in Siam, there were obtained large and valuable series of mammals, birds, reptiles, insects, mollusks, and miscellaneous invertebrates collected through the efforts of Dr. Hugh M. Smith, honorary curator in zoology on the staff of the Smithsonian Institution, who is now

fisheries advisor to the King of Siam. The material obtained this year, supplementing that mentioned in previous reports, has included a number of forms, particularly in birds, that have been new to science.

Collections from Haiti, through the financial assistance of Dr. W. L. Abbott, have included large series of plants from the northwestern part of that country secured by E. C. Leonard, of the division of plants, in the prosecution of his field studies for a flora of the island. At the same time there were obtained further collections of bones of extinct animals from cave deposits through the field researches of A. J. Poole and W. M. Perrygo, of the Museum staff, who, in addition, collected series of birds and reptiles to supplement earlier collections in these same fields. Doctor Abbott further presented an excellent collection of Siamese mammals which were obtained during an expedition under his auspices.

One of the most valuable accessions in the division of mammals has been the complete skeleton of an adult sperm whale, presented by Mr. Ippei Yokoyama, president of the Oriental Whaling Co., through the interest of Prof. Chiyomatsu Ishikawa. It was brought to this country under the direction of the Japanese ambassador, the Hon. Katsuji Debuchi. Another accession in this division consisted of 27 mammal skulls from India, received as a gift from Gen. William Mitchell.

Under the Bradshaw Hall Swales fund the division of birds secured by purchase 45 specimens of species not previously represented in its series. Through the Smithsonian Institution there were obtained by purchase from J. A. Reis, jr., 177 skeletons of birds from Cameroon, numbering about 116 species, a valuable addition to the skeleton collection. Eggs of the California condor, a bird nearly extinct in the wild state, were obtained from the National Zoological Park.

Dr. Homer W. Smith, of New York City, presented specimens of the lung fishes of Africa.

One of the important accessions in the division of insects has been a collection of Lepidoptera received as a permanent deposit from the Brooklyn Museum, which included more than 66,000 specimens, with types of about 650 species.

The division of mollusks obtained about 200,000 land shells from Cuba, collected by Dr. Paul Bartsch, traveling under the Walter Rathbone Bacon Traveling Scholarship.

Geology.—The meteorite collection has secured through purchase under the Roebling fund an iron weighing 1,060 pounds from the Zuñi Mountains south of Grant, N. Mex. A smaller specimen of the same type, also purchased from the Roebling fund, was secured from Red River County, Tex., while a third came from near Lawrence, Kans.

Through the income of the Roebling fund the mineral collections have grown in a highly gratifying manner during the past fiscal year. A striking addition to the exhibit series is a large mass of pegmatite from Newry, Me. Another purchase of importance was that of a nugget of platinum weighing 17.274 ounces from South America. There may be mentioned further a cut gem of benitoite, weighing 7.67 carats, being the largest known cut stone of this mineral.

Through the Chamberlain fund there have come to the gem collection a carved statuette of rose quartz, a Chinese carving of tourmaline, a yellow topaz weighing 34 carats, a cameo of Hungarian opal, and a cut gem of pollucite.

Fossil materials include large lots of invertebrates obtained by exchange, gift, and collection, among them three rare star fishes and five crinoids from the Ordovician of Minnesota, purchased under the Springer fund. From field work by Mr. C. W. Gilmore in Montana there have come remains of dinosaurs of several species previously not in the Museum, and there may be mentioned also specimens of Pleistocene mammals collected by Doctor Gidley in Florida.

Arts and industries.—Valuable additions in this department have included three early types of Winton automobiles; one of the engines of the Army aircraft *Question Mark* used during an endurance test that continued nearly seven days; and a working model of the telephone transmitter and receiver obtained from the American Telephone & Telegraph Co.

A horse-drawn brougham, a fine example of the work of the famous nineteenth-century coach builder, Healey, of New York, was presented by Mr. William P. Eno, an interesting object in this day of motor transport.

An exhibition now being organized dealing with mechanical power has received a number of accessions, among them an electrically operated model of the original Pearl Street electric power station in New York City.

In the division of textiles a number of manufacturers have continued their cooperation through the contribution of exhibition material of modern textiles. An interesting exhibit received from the United Shoe Machinery Corporation illustrates the entire range of shoemaking by machinery.

An important addition to the section of photography was the first portrait taken on an autochrome plate by the inventor of the process, Antoine Lumière. Four photographs donated by Philip P. Quayle, of the Peters Cartridge Co., of bullets fired from a gun, record the bullet in silhouette, and a representation of the sound waves produced.

History.—The most important accession in this division was a silk dress worn by Mrs. Martha Washington, received as a permanent loan from Mrs. Morris Whitridge in memory of her sister, Miss Sallie Pinkerton Mackenzie. This has been installed in its proper place in the series of dresses of the mistresses of the White House shown in the costumes collection.

For the military collections there was obtained a series of uniforms owned and used by Maj. Gen. Leonard Wood, United States Army, from 1898 to 1921, presented by Mrs. Leonard Wood. The naval collections received a model of the schooner *Hannah*, of Marblehead, the first armed vessel to sail at public expense during the War of the Revolution.

Through the cooperation of the American Numismatic Association a number of valuable additions were made as loans to the numismatic collection. These included 133 specimens from many countries. The Bureau of the Mint, United States Treasury Department, continued its cooperation in building up this collection by the transfer of 85 coins struck by the United States Mint in 1928, as well as other specimens.

The philatelic collection was increased by 5,775 specimens, of which the greater part was received from the International Bureau of the Universal Postal Union at Berne, Switzerland, through the Post Office Department.

REORGANIZATION OF THE MILITARY EXHIBITS

The military exhibits concerned with the World War, assembled after the close of that conflict, through necessity of available space were installed originally in widely separated halls—in part in the Natural History Building and in part in the Arts and Industries Building on the opposite side of the Smithsonian Park. These exhibits, whose assembling was possible only through the interested cooperation of the War Department, for years have been an attractive subject to large numbers of our visitors. For sometime past ways and means for a better coordinated installation of this material have been under consideration. The War department, taking renewed helpful interest in these exhibits, in 1928 appointed Maj. Louis A. O'Donnell, United States Army, to cooperate with the Museum authorities in the preparation of plans for their better display. On September 28, 1928, the War Department further announced an advisory committee to assist Major O'Donnell by consultation and cooperation as follows: Lieut. Col. Harry B. Jordan, General Staff Corps; Lieut. Col. Paul D. Bunker, Coast Artillery Corps; Maj. John W. Lang, Infantry; Maj. Marion O. French, General Staff Corps; and Capt. Edwin M. Scott, Quartermaster Corps. Through plans de-

vised by Major O'Donnell and approved by the assistant secretary, certain material was returned to the War Department as no longer needed for exhibition, an artillery park was arranged in the open on ground belonging to the Smithsonian Institution, the military collections were concentrated in one connected series in the Arts and Industries Building with the majority of the other historical collections, and definite arrangements were made for building up all the military collections along agreed lines.

In connection with the assembling of these military exhibits in the Arts and Industries Building there was required reorganization of part of the display in the divisions of mineral and mechanical technology and the transfer to the Natural History Building of the lace collections. All this has been accomplished and installation made of a considerable part of the military material. Work on the rest is progressing and will be continued along the plans definitely outlined. A part of the contemplated display will necessitate assistance in the way of additional funds, which it is hoped may be provided without too great delay.

The actual process of transfering the military collections from one building to the other began about April 1, 1929, and was a task of considerable magnitude, as it necessitated the transfer of materials covering approximately 22,000 square feet of floor space. The greater part of the work was accomplished by the staff of the division of history with the Museum labor force. The War Department cooperated measurably by the detail of five enlisted men and a truck to aid in the transfer.

This brief review of what has been accomplished will serve as partial acknowledgment of the great assistance rendered by Major O'Donnell during his connection with the Museum. On June 15 Major O'Donnell was transferred to other duties and was succeeded by Lieut. Col. Arthur Hixson, United States Army, as representative of the War Department.

EXPLORATION AND FIELD WORK

Various researches in the field have been carried on under the different departments of the Museum, principally through funds provided by the Smithsonian Institution through its private income or through the contributions of friends interested in certain projects. Limited assistance in a few instances has been given from the annual appropriation for the National Museum but this aid has comprised only a small part of the total amounts utilized, by far the greater part of which have been obtained from other sources. Additional money for such investigations is an urgent need that should be given attention. Comparatively small sums are sufficient for most of the Mu-

seum's projects, so that much good may be accomplished with slight outlay. A brief account of field activities of the present year follows:

During the spring of 1929 Dr. Walter Hough carried on archeological studies in west central Texas with a view to extending the known Pueblo or pre-Pueblo culture areas. In the same region he uncovered evidence relative to aboriginal man's early history.

From January to May, 1929, through the interest of Dr. W. L. Abbott, Herbert W. Krieger continued archeological investigations in the northern part of the Dominican Republic. The immediate culture problem that occupied his attention was to determine whether the area anciently occupied by the Ciguayan Indians of Samaná extended as far west as the valley of the Rio Yaque del Norte. A second problem was the attempt to extend the area known to have been anciently occupied by the pre-Ciguayan cave dwellers of the northern Dominican Republic. Results appear to indicate that the pre-Ciguayans had occupied the entire island, but that the Ciguayan Indians never reached as far west as the Yaque River. The work included further reconnaissance along the north shore of the Samaná Peninsula and the collection of biological material from former Indian village sites for the department of biology.

Henry B. Collins, jr., was in the field from July to October, 1928, engaged in investigations of the ancient Bering Sea culture on the islands of Punuk and St. Lawrence, with the aim of tracing early chapters in the history of western Eskimo culture. Material collected shows that there are three stages through which the art of St. Lawrence Island may be traced. An earlier stage, found only on the northern and western parts of the island on deeply patinated objects, consists of gracefully delineated straight and curved lines; an intermediate stage is simpler in design; while the third, the well-known modern and simplified art, is found at all recent sites. At Cape Prince of Wales nothing of any real antiquity was found. Results generally suggest a direct Asiatic source rather than a local cultural development for the well-known Eskimo arts. In May, 1929, Mr. Collins again left for field work to continue through the summer in the Bering Sea region. Dr. Aleš Hrdlička also proceeded to Alaska to continue his studies on early Eskimo anthropology.

Mr. Neil M. Judd was in Arizona during the summer of 1929, engaged in preparation of reports covering the 1920–1927 Pueblo Bonito explorations of the National Geographic Society, and supervising the society's 1929 beam expedition. This latter had for its object the collection of timbers from pre-Spanish Pueblo villages that will aid in completing a tree-ring chronology by means of which it is believed that absolute dates may be determined for many of our southwestern ruins.

At the end of May, 1928, Paul Bartsch, curator of mollusks, traveling under the Walter Rathbone Bacon Scholarship, began the faunal study of certain groups of land and fresh-water mollusks of the West Indies, the work for that season being prosecuted in Cuba, where he was assisted materially by Dr. Carlos de la Torre, president emeritus of the University of Habana. During four months Doctor Bartsch covered thoroughly all of the Provinces of Cuba, except that of Oriente, collecting over a quarter of a million specimens of mollusks, including large numbers of new races and species from places hitherto unexplored. The rainy season was chosen for this field work in spite of its discomforts, for it is at this time that land mollusks are most active. The collections obtained will yield much information bearing on problems of distribution, both present and past, and will throw light on the derivation of the molluscan fauna of the Antilles. Incidentally, Doctor Bartsch secured for the Museum important collections of birds, insects, batrachians, mammals, and crustacea.

Through the interest of Dr. W. L. Abbott, A. J. Poole, aid in the division of mammals, and W. M. Perrygo, of the taxidermist force, traveled in Haiti for a period of about four months, working the caves of Haiti proper and those of the island of Gonave for extinct animal bones. In addition to cavern exploration an important part of the work was the collection of birds to supplement distributional data already available, and there were obtained also mammals, mostly bats, as well as fishes, reptiles, marine invertebrates, mollusks, insects, and miscellaneous ethnological and anthropological materials.

One of the important expeditions undertaken during the year by friends of the Museum was that of the auxiliary yacht *Mary Pinchot* to the South Seas under the leadership of the Hon. Gifford Pinchot. The vessel left New York City in April for a cruise of about 10 months, with Dr. A. K. Fisher, of the Biological Survey, as naturalist, to obtain material desired for the National Museum. In the collections made in the first few weeks there have been received a skull of the little-known long-beaked porpoise *Prodelphinus plagiodon* and 10 forms of birds new to the Museum collections. Further shipments of important material are expected as the cruise continues.

Dr. Joseph F. Rock, traveling under the auspices of the National Geographic Society, visited the Kingdom of Muli, or Mili, in southwestern Szechwan, China, as well as adjacent parts of the Province of Yunnan, exploring also to the northwest of Muli in the hitherto unvisited snow range of Konka Risonquemba, rising to a height of 25,000 feet, and mountains to the east and northeast. From this work there have been obtained important collections of birds and plants, the specimens coming to the National Museum through the gift of the National Geographic Society.

Dr. Hugh M. Smith, in the course of fisheries investigations in Siam, visited the northern part of that country in November and December of 1928 and made hurried collections on Doi Angka and Doi Sutep, two previously unexplored peaks of the Khun Tan Mountains. Material secured has been of particular interest and has resulted in the discovery of new and rare species, among them seven new forms of birds.

Dr. David C. Graham continued work in the vicinity of Suifu, in the Province of Szechwan, China, and in July, 1928, set out on a journey to Ningyuenfu, by way of Yachow, spending about two months on the trip. Though bandits threatened at most of the interesting points, many valuable specimens were obtained.

During brief field investigations into the hosts of certain parasites in Virginia and North Carolina, Dr. H. E. Ewing, of the Bureau of Entomology, was accompanied by C. S. East, of the preparator staff, who collected a small series of birds for skeletons.

Dr. J. M. Aldrich, of the division of insects, began work in May, 1929, on type specimens of diptera in the British Museum, and later did some collecting of northern insects, principally diptera, in Norway and Sweden.

Dr. Waldo L. Schmitt and C. R. Shoemaker, in the course of an examination of the crustacean fauna of the region about the United States Bureau of Fisheries station at Beaufort, N. C., secured more than 1,300 specimens of marine invertebrates. Mr. J. O. Maloney, by invitation of Mr. Copley Amory, was detailed for part of the summer of 1928 to proceed to Canada in continuation of the biological survey of Mr. Amory's estate on the north shore of the Gulf of St. Lawrence, near the Matamek River. Doctor Bartsch visited the Marine Biological Laboratory at the Tortugas, Fla., from August 17 to August 30, 1928, in connection with work on the crossbreeding of Cerions, an investigation carried on in cooperation with the Carnegie Institution of Washington. While at the Tortugas Doctor Bartsch spent a day under water with the diving hood and the undersea camera going over fields photographed formerly in order to have a continuous record of life on the reefs.

From December, 1928, to the latter part of May, 1929, Mr. E. C. Leonard was engaged in botanical field work in northwestern Haiti, through the generous support of Dr. W. L. Abbott. Large collections (nearly 15,000 specimens) were obtained, which will be of very material assistance in making known the flora of Hispaniola, a project upon which Mr. Leonard has been engaged for several years. During the last three months of the fiscal year Mr. E. P. Killip, accompanied by Mr. A. E. Smith and Mr. W. J. Dennis, honorary collaborators, has prosecuted botanical explorations in eastern Peru

and adjacent regions. Reports from the field indicate that a large amount of herbarium material is being obtained that will be exceedingly valuable in current studies of the flora of western South America.

In July and August, 1928, Dr. A. S. Hitchcock, custodian of grasses, visited Newfoundland and Labrador for the purpose of studying and collecting grasses. A large illustrative series of specimens and much useful information regarding the range of species in these little-explored regions were obtained. Mr. Jason R. Swallen, assistant in the grass herbarium, spent the summer of 1928 in field work in the southwestern United States. Many of the rarer grasses were collected, as well as other material relating to current studies.

Dr. George P. Merrill, head curator of the Department of Geology, was detailed in September, 1928, to visit various mineral localities in the New England States. He first worked at the pegmatite deposits at Newry, Me., where the fine block of material mentioned elsewhere in this report was obtained. The historically interesting gem locality at Paris Hill was next given attention; then various localities in New Hampshire, all of exceptional interest. Following this, the feldspar prospects at Bellows Falls, Vt., were examined. The acquisition of the feldspar vein at Newry, Me., was considered to have more than compensated for the trip.

The explorations of Dr. W. F. Foshag were still under way at the close of the year. He reports interesting collections, particularly some borate minerals from various localities in southern California and Nevada. A part of this material has reached the Museum, but the recording will go over until the entire collection is received.

Messrs. James Benn and B. O. Reberholt were on several occasions detailed to collect geological specimens in adjacent localities in Maryland and Virginia where desirable materials could be obtained.

Stratigraphic studies of the Cambrian as developed in the larger mountain range of Wyoming were the main object of an expedition in 1928 by C. E. Resser. Nearly three months were spent in this investigation, in the course of which several mountain ranges were explored. Collections of fossils were limited, the rocks in many cases being of such shallow-water origin that the fossils have been destroyed. Much valuable information relating to stratigraphy was obtained.

Since the field exploration undertaken by C. W. Gilmore and his party in the Two Medicine formation in Montana extended well into the present year, but brief mention was made of it in last year's report. The expedition, which was in the field from May 12 to July 15, 1928, covered the Bad Land areas along the Milk and Two Medicine Rivers, on the Blackfeet Indian Reservation. Considerable

success attended the work, the collections being sufficient in scope to be fairly representative of the fauna of the formation. The material as a whole is a most important addition to our series, in which practically all of the forms found were previously unrepresented. Scientifically it will be of interest, not only for the new species found, but for its decided contribution to the meager knowledge of the fauna of the formation, placing this on a basis that will permit of its comprehensive comparison with other Upper Cretaceous formations of contiguous areas.

Upon completion of the above work Mr. Gilmore visited the Bear Creek Coal Field in southern Montana for the purpose of securing some of the Paleocene mammal remains occurring in the Eagle Mine at that place. Lack of time prevented search being made for these minute fossils on the ground, but 400 pounds of the fossil-bearing matrix were boxed and shipped to the Museum.

In the early spring of 1929 work was again taken up at Melbourne, Fla., by Dr. J. W. Gidley, in continuation of the project relative to the presence of early man in Florida. About six weeks were spent in this work, for which generous financial assistance was furnished by Mr. Childs Frick. Again important evidence was gathered indicating the presence of man in Florida contemporaneous with an extinct fauna of the Pleistocene, while the mammal remains obtained will be useful in determining the exact phase of the Pleistocene represented—a still unsettled part of the general problem under investigation. In this connection it may be mentioned that assistance is being rendered by Dr. Thomas Barbour, of the Museum of Comparative Zoölogy, in continuing collecting activities in this area. The material thus obtained is being placed at the disposal of Doctor Gidley for study.

Almost at the end of the fiscal year Doctor Gidley was detailed to visit fossil-bearing beds discovered by a United States Geological Survey party at points in Idaho. Since operations had hardly begun at the close of the year, a statement regarding them will go over until next year.

In cooperation with the Peabody Museum of Yale University, Mr. N. H. Boss was detailed late in March, 1929, to engage in further exploration of a cave in New Mexico where a giant ground sloth was found last year, as well as to search other similar caves in the region. Following these operations, Mr. Boss joined Mr. Gilmore in an expedition to the San Juan Basin, N. Mex., to collect dinosaur and other vertebrate remains. As this work is expected to continue into the next fiscal year, no detailed report on either expedition will be given at this time.

Mr. Remington Kellogg and Norman H. Boss continued explorations of the Miocene along Chesapeake Bay from time to time. At little expense to the Museum, various fossil cetacean remains were added to the collection.

BUILDINGS AND EQUIPMENT

Usual repairs have been required to keep the buildings housing the national collections in proper condition during the year. In the Natural History Building exterior woodwork in the east court was painted; the walls and ceilings in 24 rooms on the ground and third floors were repainted, a necessary renovation that has been postponed for years and now must be completed in order to properly protect the surfaces in question. A section of concrete roadway opposite the east wing was renewed and temporary repair work was done on the roadways of the north entrance and on the west side of the building. The need for planting shrubbery to relieve the barrenness of the approach to the north entrance of this building has long been felt, so that it is pleasant to report that in the fall of 1928, through cooperation of the Office of Public Buildings and Public Parks, two beds of evergreens were planted, one on either side of the drive, greatly improving the appearance of this side of the building.

Work on safeguarding the dome above the rotunda began on September 12, 1928, and was finally completed on May 14, 1929, the work being performed under the efficient direction of the engineers in the Office of the Supervising Architect of the Treasury Department. Two great bands of steel were placed around the four huge piers that support the dome, one at the level of the floor of the attic and one near the tops of the piers and ceiling above. Between them steel beams were installed extending vertically from band to band behind the piers, with a series of screw jacks between the beams and the piers proper. Tension was placed on these jacks in such a way as to bring even strain all around, holding the piers from any possibility of spreading at the top. The delicate operation of adjusting the screw jacks, which required nearly three weeks for completion, was performed with the cooperation of a corps of engineers from the Bureau of Standards. Work of cleaning the stone surfaces in the rotunda and the painting necessary following the work outlined above was still in progress at the close of the fiscal year. The rotunda has been closed to the public since December 1, 1927, but will be opened early in the next fiscal year. In the Arts and Industries Building the café at the west entrance was remodeled, walls and ceilings in various rooms were painted, and necessary refinishing on exterior surfaces was carried on so far as was practicable.

In the herbarium hall in the Smithsonian Building cork carpet was laid on the floors, and exposed floors were painted, together with the walls and ceilings in various other rooms. An old stone walk on the south side of the building in bad condition was replaced by concrete. Grills were installed in window openings on the north and south sides in the new gallary of the herbarium hall.

The roof of the aircraft building was painted, as well as the exterior of the south shed.

The power plant was in operation from September 30, 1928, until May 28, 1929. The consumption of coal was 3,361 tons, an amount slightly less than that used in 1928. The average cost of coal was $5.36 per ton, somewhat less than that for last year. The Steamboat Inspection Service of the United States examined the boilers during the summer and reported them in good condition. The elevators have been regularly inspected by the District of Columbia inspector. The total electric current produced amounted to 648,863 kilowatt-hours, manufactured at a cost of 1.89 cents per kilowatt-hour, including interest on the plant, depreciation, repair, and material. The amount of electric current produced represents approximately an increase of 45,000 kilowatt-hours over any previous year. Demands for electric current are steadily increasing and further provision is required to be made before long for this current since our plant is now practically at the maximum peak of production. The ice plant manufactured 409 tons of ice at an average cost of $1.80 per ton, which is at a cost considerably less than for the present year due to the fact that there has been very little need for repairs.

During the year 30 exhibition cases and bases, 179 pieces of storage, laboratory and other furniture, and 1,476 drawers of various kinds were added, practically all of these being manufactured in our shops.

MEETINGS AND RECEPTIONS

The lecture rooms and auditorium of the National Museum during the present year were used for 125 meetings, covering a wide range of activities. Government agencies that utilized these facilities for hearings, meetings, lectures, and other special occasions included the Forest Service, the Bureau of Fisheries, the Geological Survey, the Public Health Service, and the Extension Service of the United States Department of Agriculture. The Forest Service arranged a series of addresses during the year on various matters connected with their work.

Scientific societies that met regularly in the auditorium or small lecture room included the Entomological Society of Washington, the Society for Philosophical Inquiry, the Anthropological Society of Washington, the American Horticultural Society, and the Hel-

minthological Society. Meetings were held also by the Washington Society of Engineers, the Wild Flower Preservation Society, the Potomac Garden Club, the Biological Society of Washington, the Botanical Society of Washington, the Aero Club of Washington, and the Vivarium Society. The National Association of Retired Federal Employees held regular meeetings through the year, as did various groups of Boy Scouts for special addresses.

On February 22 there was a patriotic meeting under the auspices of the Masonic Clubs of the District of Columbia, addressed by Congressman C. A. Woodrum, of Virginia, on George Washington, with music furnished by the Masonic band. Groups of pupils from the public schools, Divisions I to IX, were addressed on May 28 by Dr. H. A. Smith, of the Department of Agriculture, on the protection of forests. On May 29 the Veterans of Foreign Wars of the United States, Federal Post No. 824, United States Department of Agriculture, held memorial services in the auditorium. Groups of students from Howard University were convened for special addresses on medical subjects on several occasions.

The biennial conference of the Division of Scientific Inquiry of the Bureau of Fisheries of the United States Department of Commerce took place from January 2 to 5, inclusive. The fiftieth anniversary celebration of the Geological Survey, United States Department of the Interior, was held on March 21.

The sixth National Oratorical Contest took place on April 25; and the fifth annual National Spelling Bee on May 21, the first prize being won by Miss Virginia Hogan, representing the Omaha World Herald. The Public Health Service, United States Treasury Department, held the twenty-seventh annual conference of State and Territorial health officers on June 3–4.

Boy scout executives of the scout councils held their third regional scout seminar on October 22–23. The third regional scout executive seminar of the Boy Scouts of America came on January 14. On January 30 the Early Birds, an organization interested in aeronautics, convened for an illustrated lecture.

A memorial meeting was held October 16 to commemorate the services to science of the late Dr. Eugene A. Schwarz. A memorial meeting came also on March 26 in commemoration of the life and work of the late Dr. Robert Ridgway, curator of birds in the United States National Museum.

An exhibit of the work of students in the department of architecture of George Washington University was held from April 21 to May 6. From May 15 to 27 there was displayed an exhibition by negro artists, assembled under the auspices of the Harmon Foundation and shown under the patronage of the committee on race relations of the Washington Federation of Churches.

MISCELLANEOUS

The exhibition halls of the National Museum were open during the year on week days from 9 a. m. to 4.30 p. m., and in addition the Natural History Building, the Arts and Industries Building, and the Smithsonian Building were opened Sunday afternoon from 1.30 to 4.30. All buildings were closed on the day before Christmas, Christmas Day, New Year's Day, and Inauguration Day. On Saturday, March 2, by special request of the committee in charge of inaugural arrangements, all buildings were held open until 5 p. m. to allow persons assembled for the inaugural ceremonies a better opportunity to view the exhibits. The flags on all buildings were flown at half-mast on March 26, 1929, out of respect to the late Marshall Foch, and on Memorial Day, May 30, from 8.30 a. m. until noon.

Visitors to the Museum during the year totaled 1,929,625 persons, an increase of more than half a million over the previous year, an indication of the increasing interest of all Americans in the Capital City, and of the attractions found in the exhibitions of the National Museum by the traveling public. Attendance in the several buildings of the National Museum was recorded as follows: Smithsonian Institution, 277,295; Arts and Industries, 868,952; Natural History, 650,-815; Aircraft, 132,563. The average daily attendance for week days was 5,175 and for Sunday 6,330. The latter figure is a definite indication of the public desire for the opening of our exhibits on Sunday afternoons.

During the year the Museum published eight separate volumes and 61 miscellaneous papers, while the distribution of literature amounted to 115,128 copies of its various books and pamphlets. Additions to the Museum library included 2,247 volumes and 748 pamphlets obtained partly by exchange, partly by donation, and in small part by purchase from the modest sums available for that purpose. The library of the National Museum, as separate from that of the Smithsonian Institution proper, has now 74,562 volumes and 107,629 pamphlets. Though many of the accessions for the present year, as usual, came through exchanges of publications, there may be noted the gift of 1,000 volumes, pamphlets, and manuscripts of a miscellaneous character from Mr. Herbert A. Gill, of Washington, D. C., these pertaining in large part to the work of the late Dr. Theodore Gill, at one time librarian and associate in zoology of the Smithsonian Institution. Five hundred books and periodicals on photography, both American and British, some of them old and rare, came from Mr. A. B. Stebbins, of Canisteo, N. Y. The first four volumes of the Smithsonian Scientific Series, Patrons' edition, were presented by the Smithsonian Institution. Thirty publications were given by the American Association for the Advancement of Science.

The Museum maintains 36 sectional libraries in connection with its various scientific divisions. The library during the year made substantial progress in organization and increased efficiency along the lines of a program of development initiated five years ago.

Dr. J. A. Stevenson, of the Bureau of Plant Industry, United States Department of Agriculture, was given honorary appointment as custodian of the C. G. Lloyd mycological collection. Mr. Albert C. Smith and Mr. W. T. Dennis, who accompanied Mr. E. P. Killip on a botanical expedition to Peru, were given honorary appointments as collaborators in the division of plants. In the division of insects the interest and valuable aid of Mr. J. T. Barnes were recognized by his appointment to the honorary position of collaborator in the section of lepidoptera.

Mr. Conrad V. Morton and Mr. Egbert H. Walker were appointed aids in the division of plants. Dr. Remington Kellogg was made assistant curator in the division of mammals by transfer from the Biological Survey, United States Department of Agriculture, this position being one newly established this year. Mr. Frank A. Taylor, in the division of mineral and mechanical technology, was advanced from aid to assistant curator. Miss Ethel A. L. Lacy was appointed librarian in immediate charge of the accessions department of the library. Mr. W. L. Brown was advanced to the position of chief taxidermist, with general oversight of the work of the taxidermy shop.

Two employees left the service through the operation of the retirement act—William H. Kimball, finance clerk, after a total Government service of about 46 years, nearly 45 of which were in the National Museum, and Robert Stokes, laborer, on June 11, 1929, after a service of 28 years.

The Museum lost through death during the year six of its active workers and four members of its honorary scientific staff. Dr. Robert Ridgway, curator of birds, died March 25, 1929. Capt. John Donnell Smith, associate in botany, died on December 2, 1928. Dr. E. A. Schwarz, custodian of coleoptera, died on October 15, 1928. Dr. Harrison G. Dyar, custodian of lepidoptera, died January 21, 1929. Mr. H. K. Harring, custodian of rotatoria, died on December 19, 1928. Other losses by death included Mr. Charles E. Mirguet, taxidermist, on February 20, 1929; Mrs. E. Bennett Decker, clerk-illustrator, August 29, 1929; Eustance S. Brannon, watchman, on September 30, 1928; Frank Smith, laborer, on November 16, 1928; and William T. Murray, laborer, on June 9, 1929.

Respectfully submitted.

ALEXANDER WETMORE,
Assistant Secretary.

Dr. CHARLES G. ABBOT,
Secretary, Smithsonian Institution.

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APPENDIX 2

REPORT ON THE NATIONAL GALLERY OF ART

SIR: I have the honor to submit herewith a report on the activities of the National Gallery of Art for the fiscal year ending June 30, 1929.

The year is made notable by the gift of an important collection of art works by Mr. John Gellatly, of New York. Through the instrumentality of Mr. Gari Melchers, chairman of the Gallery Commission, the donor indicated his desire, certain conditions being complied with, to present to the Nation for permanent assignment to the National Gallery of Art his collection of art works, comprising more than 100 choice examples of American painting in oil and water colors, large collections of jewelry, tapestries, glassware, and other art works, having an estimated value of several millions of dollars. After a preliminary hearing before the executive committee of the Board of Regents of the Institution, Mr. Frederic A. Delano, Hon. Reed Smoot, and Dr. John C. Merriam, a special meeting of the gallery commission was called April 13, 1929, to consider the offer. After hearing in some detail of the collection offered, of the conditions imposed by the donor, and the responsibilities necessarily assumed by the Institution and the Nation, acceptance was recommended to the Board of Regents. Subsequently the Congress passed a joint resolution which was approved by the President, June 6, 1929, authorizing the Institution to convey appropriate acknowledgments to Mr. Gellatly and to include in its estimates sums necessary for the accommodation and maintenance of the collection. The collection is at present installed in the Heckscher Building in New York City, where it is to remain for four years. A portfolio of 45 plates illustrating the collection was subsequently presented by Mr. Gellatly to the Institution and assigned by Secretary Abbot to the care of the National Gallery.

THE GALLERY COMMISSION

The eighth annual meeting of the gallery commission was held in the Regents' room of the Institution at 10.30 a. m., December 11, 1928. The members present were Messrs. James E. Fraser, J. H.

Gest, John E. Lodge, Charles Moore, James Parmelee, E. C. Tarbell, W. H. Holmes, and C. G. Abbot, secretary of the Smithsonian Institution. In the absence of the chairman of the commission, Mr. Gari Melchers, Mr. Charles Moore was elected temporary chairman.

The minutes of the previous annual meeting were read and approved, followed by the reading and approval of the secretary's report on the activities of the gallery for the year.

The committee on resolutions on the death of Dr. Charles Doolittle Walcott, Secretary of the Institution, appointed at the annual meeting of December 6, 1927, presented the following, which was adopted:

Whereas the National Gallery of Art Commission of the Smithsonian Institution, having learned of the death on February 9, 1927, of Dr. Charles D. Walcott, Secretary of the Smithsonian Institution and ex officio a member of this commission, has adopted the following resolution:

Resolved, That we here record our profound sorrow at the passing of this distinguished man of science, whose achievements as the head of the Smithsonian Institution expanded its renown and added greatly to the sum of human knowledge; but particularly are we desirous of expressing our sense of the loss of one who was also keenly alive to the importance of developing the art side of the Institution's activities, and to whose foresight is due the establishment of this commission as a means of insuring a high standard of excellence for the art works acquired by the National Gallery of Art.

Resolved, That these resolutions be incorporated in the present annual report of the commission to the Board of Regents and that a copy of them be transmitted by the Secretary of the commission to the family of Doctor Walcott.

DR. C. G. ABBOT,
DR. W. H. HOLMES,
Committee.

The chairman asked Mr. Lodge in regard to the relationship of the Freer Gallery to the National Gallery, and Mr. Lodge explained that, as he understood it, Mr. Freer had desired that his gift should be regarded as a branch of the National Gallery, to be separately provided for and installed.

The chairman called attention to a project advocated by persons interested in the promotion of American art, which project favors the establishment of a fund to be devoted to the aid of young, promising artists. The suggestion was favorably commented upon and the feasibility of securing support of the undertaking was discussed at some length. The chairman was authorized to take the matter up with such persons and institutions as he might find sympathetic.

THE HENRY WARD RANGER FUND

The paintings purchased during the year by the council of the National Academy of Design as provided by the Henry Ward Ranger

bequest are as follows, including the names of the institutions to which they have been assigned:

Title	Artist	Date of purchase	Assignment
69. South Dakota Evening	Jes W. Schlaikjer	December, 1928	Vassar College, Poughkeepsie, N. Y.
70. Fifth Lake	Edgar Payne	do	The James Lee Memorial Academy of Arts, Memphis, Tenn.
71. The Harvest Moon	Charles Melville Dewey	January, 1929	The Fine Arts Society of San Diego, San Diego, Calif.
72. The Golden Hour	George Elmer Browne	March, 1929	Michigan State College of Agriculture and Applied Sciences, East Lansing, Mich.
73. The Burro	Ernest L. Blumenschein, N. A.	do	The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y.
74. Hemlock Grove	Emil Carlsen, N. A	do	The Portland Society of Art, Portland, Me.
75. Summer Plumes	Gustave Cimiotti	do	The Newark Museum Association, Newark, N. J.
76. Fishing Fleet	Malcolm Humphreys	do	Not reported.

The paintings purchased from the Ranger fund during the last fiscal year and unassigned at its close (1927–28) have subsequently been assigned as follows:

63. Cypripedia, by Sergeant Kendall, N. A.; to the California Palace of the Legion of Honor, San Francisco, Calif.

The project of assembling the Ranger purchases thus far made for temporary exhibition in the National Gallery of Art has been considered from time to time, but action has been delayed, due to the lack of funds requisite for expenses of packing and shipping. At the special meeting of the commission, held April 13, 1929, Mr. Gari Melchers, chairman, made the welcome announcement that the Carnegie Corporation of New York had generously allowed $1,000 for this purpose. It was deemed advisable by members of the commission present to hold the exhibition not later than December 1, 1929, and Secretary Abbot volunteered to take up at once the necessary correspondence with the National Academy of Design and with the several institutions holding the works.

SPECIAL EXHIBITIONS HELD IN THE GALLERY

Six loan exhibits of art works added greatly to the interest of the year's activities; these, briefly summarized, are as follows:

PORTRAITS BY M. L. THEO DUBÉ

Four portraits by the distinguished French painter, M. L. Theo Dubé, membre Societaire de la Société des Artistes Français, were

exhibited in the middle room of the gallery from November 16 to December 14, 1928. The group included two compositions—A Tramp and Coquetry, and portraits of President Woodrow Wilson, 1913, and Senator Mascurand, of France.

GOTHIC CATHEDRALS OF FRANCE

A noteworthy collection of paintings of the Gothic cathedrals of France, 27 in number, by Pieter van Veen, Dutch-American painter, was exhibited under the patronage of his excellency the French ambassador in Washington, the Hon. Paul Claudel, from December 8 to 31. A printed illustrated catalogue of the collection was supplied by the artist and cards of invitation were issued for a special view on December 8.

MINIATURES BY EDWARD GREENE MALBONE

A very important exhibit of early American miniatures, the life work of Edward Greene Malbone (1770–1807), was shown in the middle room of the gallery from February 23 to April 21, 1929. Cards of invitation to the opening were issued. The collection was assembled as the result of extensive correspondence and appeal and arranged for exhibition by Mr. Ruel P. Tolman, curator of graphic arts in the National Museum. Mr. Tolman prepared also the illustrated catalogue supplied by the gallery.

WATER-COLOR PAINTINGS OF INDIA

A collection of 42 masterly water-color paintings by William Spencer Bagdatopoulos, English painter and etcher, of scenes and figure subjects in India, was shown in the northeast room of the gallery February 15 to March 15, 1929. A catalogue of the collection was furnished by the artist.

ARCTIC AND ANTARCTIC SCENES AND CHARACTER STUDIES

On March 2 the gallery received and placed on view in the south room an important collection of paintings by Frank Wilbert Stokes. Mr. Stokes is probably the only person who has visited and painted in both polar regions. His collection is the fruit of four separate expeditions and numbers 500 works covering a wide range of subject matter. The selections forwarded and placed on view in the gallery comprise 17 landscapes, 10 portrait studies of Eskimo, and 10 minor landscape studies. Mr. Stokes's work has the full approval of Commander R. E. Byrd, United States Navy, with whom he visited the scenes and people portrayed. The collection remains on view at the close of the year.

PAINTING AND SCULPTURE BY AMERICAN NEGRO ARTISTS

An exhibition of 64 paintings and several pieces of sculpture, the work of American negro artists, was shown in the foyer of the museum from May 16 to 27, 1929. This collection was shown in New York City in connection with the annual William E. Harmon awards for distinguished achievement among negroes. It was brought to Washington under the patronage of the committee on race relations of the Washington Federation of Churches and under the immediate supervision of Dr. Anson Phelps Stokes, canon of Washington Cathedral, chairman of the committee, and Dr. Emmett J. Scott, secretary-treasurer of Howard University, secretary. Invitation cards were issued by the gallery and a catalogue of the collection was supplied by the committee.

REINSTALLATION OF COLLECTIONS

The two-feathered Serpent Column models, the mutilated originals of which are still in place in the portal of the Pyramid Temple known as the "Castillo," or castle, in Chichen Itza, Yucatan, were removed from the lobby to the second floor, thus taking their place with the archeological collections to which they pertain. The space at the east end of the lobby thus made vacant is now occupied by the handsome mantelpiece and fireplace, by Richardson, transferred to the Museum when the residence of Benjamin H. Warder was dismantled in 1924.

THE ALFRED DUANE PELL COLLECTION

In April, 1929, a large portion of the Alfred Duane Pell collection which, due to lack of space in the National Gallery, had been installed temporarily in the Arts and Industries Building, was transferred to the Pell alcove at the north end of the gallery. A series of busts of Sèvres biscuit ware belonging to the collection, remains for the present in the Arts and Industries Building. A catalogue of this material, 996 numbers, was compiled by Miss Helen A. Olmstead, of the department of arts and industries, National Museum, under the expert supervision of Dr. S. W. Woodhouse.

ART WORKS RECEIVED DURING THE YEAR

Accessions of art works by the Smithsonian Institution, subject to transfer to the National Gallery on approval of the advisory committee of the National Gallery of Art Commission, are as follows:

Portrait bust in bronze of the Hon. Elihu Root, by James Earle Fraser, N. A. A replica of the bust made for the Carnegie Corporation of New York. (Donor not ascertained.)

Four specimens of modern Japanese cloisonné; gift of Seth B. Robinson, jr., and T. Dudley Robinson, of New York City.

The John Gellatly collection of art objects, presented to the Nation for eventual assignment to the National Gallery of Art. Accepted by Congress under a joint resolution approved by the President on June 6, 1929. This collection is now housed in the Heckscher Building, 730 Fifth Avenue, New York City, where it is to remain for four years, becoming then available for transfer to the gallery.

LOANS ACCEPTED BY THE GALLERY

A painting entitled "Mist in Kanab Canyon, Utah," by Thomas Moran, 1892; lent by Mrs. Bessie B. Croffut, Washington, D. C.

A painting entitled "A Rainy Day," by Peter Moran; lent by the Misses Grandin, Washington, D. C.

Two paintings by Gilbert Stuart—portrait of Thomas Amory, of Boston, and portrait of George A. Otis; lent by Mrs. O. H. Ernst and Miss Helen Amory Ernst, of Washington, D. C.

Portrait bust in marble of Mrs. Nicholas Longworth, by Moses W. Dykaar; lent by the sculptor.

Portrait bust in bronze of Hon. Wade H. Ellis, by Joseph Anthony Atchison; lent by the sculptor.

Three paintings by old masters—Madonna and Child, by Alonzo Cano (1601–1667); The Madonna, by Carlo Dulci (1616–1686); and Saint with Book, by Giuseppe Ribera (Spagnoletto) (1588–1656); lent by Mr. and Mrs. Maxim Karolik, Washington, D. C.

Portrait of Mrs. Charles Eames, by Gambardella; lent by Mrs. Alistair Gordon Cumming, Washington, D. C.

DISTRIBUTIONS

Two landscape models by G. C. Curtis, sculptor, 1902, showing the park scheme of the city of Washington, lent to the gallery in 1917 by the National Commission of Fine Arts, were withdrawn by the commission through Mr. H. P. Caemmerer, secretary and executive officer.

The collection of paintings, landscapes, colonial mansions, etc., by John Ross Key, originally received January 15, 1927, as a temporary exhibit by the artist's widow, and retained at her request and the request of certain Members of Congress, in order that it might be available for inspection by a suggested congressional committee, was withdrawn by Mrs. John Ross Key April 25, 1929.

The painting Love and Life, by George Frederick Watts, a gift of the artist to the American people in 1893 and shown at the World's Columbian Exposition at Chicago, accepted by act of Congress July 23, 1894, and transferred from the White House to the National

Gallery March 21, 1921, was recalled to the White House by President Herbert Hoover on March 11, 1929, where it has an honored place in his study.

An early painting by George Inness, lent to the gallery by Col. Henry C. Davis, United States Marine Corps, was withdrawn by Mrs. Davis, his widow, of Coronado, Calif.

An Italian masterpiece, The Immaculate Conception with the Mirror, by Murillo, lent to the gallery by Mr. DeWitt V. Hutchins on April 28, 1928, was withdrawn by Mr. Hutchins and shipped by his order to Thomas J. Kerr, New York City, on June 24, 1929.

The portrait bust in plaster of President James Monroe, by Mrs. Margaret French Cresson, was withdrawn by the sculptor.

The portrait of Surg. Bailey Washington, jr., United States Navy, (1787–1854), by an artist unknown, was withdrawn by Mr. John Washington Davidge upon order from the owner, Miss Alice M. Reading, of Reading, Calif.

LOANS BY THE GALLERY

At the request of Mrs. Herbert Hoover, two paintings belonging to the William T. Evans collection of contemporary American paintings—The Flume, Opalescent River, Adirondacks, by Alexander Wyant, and Castle Creek Canyon, South Dakota, by Frank De Haven—were lent to the White House, for temporary embellishment of the state dining room, on May 23, 1929.

MISCELLANEOUS

Four large ebonized kensington cases of the gem type have been added to the gallery furnishings; these are for the accommodation of that portion of the Alfred Duane Pell collection recently transferred from the Arts and Industries Building. Four No. 500 "window spot reflectors" have been installed in the skylight over the middle room of the gallery for the better lighting of the art works on dark days.

LIBRARY

The gallery library has been increased by gift, purchase, and subscription in volumes, pamphlets, periodicals, etc.

A gift made possible through a fund in Yale University established by Canon Anson Phelps Stokes, consisting of a set of 14 etchings made for the Yale University Press by Louis Orr, entitled "Ports of America," was added to the library pending other assignment when the various departments of the gallery are more fully established.

PUBLICATIONS

HOLMES, W. H. Report on the National Gallery of Art for the year ending June 30, 1928. Appendix 2, report of the secretary of the Smithsonian Institution for the year ending June 30, 1928, pp. 52–62.

Catalogue of A Group of Original Paintings of the Gothic Cathedrals of France, by Pieter van Veen, on view in the National Gallery, Natural History Building, United States National Museum, December 8 to December 31, 1928. Under the patronage of his excellency the French ambassador, Hon. Paul Claudel. Washington, 1928; 6 pp.; 2 plates.

Catalogue of A Collection of Water-Color Paintings of India, by W. S. Bagdatopoulos, on view in the National Gallery of Art, United States National Museum Building, February 15 to March 15, 1929. Washington, 1929, 4 pp.

Catalogue of Miniatures and Other Works, by Edward Greene Malbone, 1777–1807. February 23–April 21, 1929. Washington, 1929, 21 pp.; 5 plates.

Catalogue of An Exhibition of Paintings and Sculpture by American Negro Artists, at the National Gallery of Art, Smithsonian Institution, Washington, D. C. May 16–May 29, 1929. Washington, 1929; 15 pp.; 11 illustrations.

Respectfully submitted.

W. H. HOLMES, *Director.*

Dr. C. G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 3

REPORT ON THE FREER GALLERY OF ART

SIR: I have the honor to submit the ninth annual report on the Freer Gallery of Art for the year ending June 30, 1929:

THE COLLECTIONS

Additions to the collections by purchase are as follows:

BOOKBINDING

29.20. Persian, sixteenth-seventeenth century. Turkish school. Red leather, with decorations in stamped arabesques on gold.

29.21. Egyptian, fifteenth century. Brown leather, decorated in blind and gold tooling.

29.22. Egyptian, fourteenth century. Dark-brown leather, decorated in blind and gold tooling.

29.23. Egyptian, fifteenth century. Red leather, decorated in blind and gold tooling.

29.24. Persian, sixteenth century. Light-brown leather, lined with rose-red leather. Decorations in blind and gold tooling, and in stamped arabesques on gold and blue grounds.

BRONZE

29.4. Chinese, sixth century or earlier. Period of the Six Dynasties. A large mirror, the back decorated with engraved silhouettes of gold and silver set in lacquer.

29.17. Chinese, seventh-tenth century. T'ang period. A mirror with phoenix and running animal figures in relief on the back.

29.18. Chinese, sixth-seventh century. Sui period. A mirror with formalized design of palmettes in circles in relief on the back.

29.19. Chinese, third century B. C.(?). Han period or earlier. A sword, with ornamental designs inlaid in gold on the pommel, and in gold and turquoise on the guard, while both sides of the blade carry inscriptions, also inlaid in gold.

GLASS

29.8. Syrian, thirteenth-fourteenth century. A pilgrim bottle, of transparent blown glass, decorated with polychrome enamels and gold.

MANUSCRIPTS

29.63. Persian, seventeenth century. By Kemāl ad-Din. A page of calligraphy in four colors on a pinkish-cream paper. Ornaments of floral arabesques on a gold ground. Signed.

29.64. Persian, seventeenth century. By Kemāl ad-Dīn. A page of calligraphy in three colors on a pinkish-cream paper. Ornaments of floral arabesques on grounds of gold and blue.

29.65. Persian, seventeenth century. A page of calligraphy in three colors on blue paper with a floral ornament in gold.

29.66. Turkish, sixteenth century. A page of *nastaliq* script in white on a green ground. The writing is cut from paper and mounted. Ornamental band in colors and gold.

29.67. Turkish, sixteenth century. A page of *nastaliq* script in white on a blue ground. The writing is cut from paper and mounted. Ornamental band in colors and gold.

29.68. North African, sixteenth century. Two sheets of parchment (from a
29.69. book) with *Maghrībi* writing on both sides in brown and blue. Ornaments in gold and color.

29.70. Persian, eleventh-twelfth century. A sheet of paper (from a book) with *Kufic* script on both sides in black, red, and gold. Page ornaments in gold and black.

29.71. Egyptian(?), eighth-ninth century(?). A sheet of parchment (from a book) with *Kufic* script on both sides in black and red. Ornaments in gold, black, and red.

29.72. Egyptian(?), eighth-ninth century(?). A sheet of parchment (from a book) with *Kufic* script on both sides in black and red.

29.73. Egyptian, thirteenth century. A frontispiece of a Koran with *naskh* script in black on paper. Borders, medallions, and small ornaments in gold and black.

29.74. Egyptian, thirteenth century. A frontispiece of a Koran with *naskh* script in black on paper. Borders, medallions, and small ornaments in gold and black.

PAINTING

29.1. Chinese, dated in correspondence with A. D. 797. A fragment of a Buddist scripture from Tun-huang, with figures of Buddhas and Bodhisattvas. In colors on paper.

29.2. Japanese, eleventh century. Fujiwara Buddhist. *Hōrōkaku Mandara:* The Buddha and attendant divinities In color and gold on silk; mounted as a panel.

29.3. Indian, seventeenth century. Mughal. A prince and an ascetic. In colors and gold on paper.

29.76. Indian, seventeenth century. A pilgrim and an ascetic in conversation. In delicate color on paper.

29.25. Persian, thirteenth century. Mongol school. Twenty-two illustrations
29.46. on loose leaves of a *Shāh Nāmah*, rendered in colors, black, gold, and silver (oxydized).

29.75. Persian, sixteenth-seventeenth century. Turkish school. A court scene. in bright colors and gold on paper.

29.77. Persian, about 1600. Shāh 'Abbās school, in the style of Yūsuf. A man playing on a lute. In full color and gold on paper.

29.78. Persian, seventeenth century. Two pheasants. In full color and gold on paper.

29.79. Persian, middle fifteenth century. Timurid school. A warrior of Tīmūr. Drawn in black and slight tint, with ornamental details in gold.

29.80. Indian, early seventeenth century. Mughal, time of Jahāngīr. A love scene. In colors and gold on paper.

29.81. Indian, middle seventeenth century. Mughal, time of Shāh Jahān. Portrait of Asālat Khān. In white, black, color, and gold on paper.

POTTERY

29.6. Chinese, T'ang dynasty. A cylindrical jar with ribbed sides and three stump feet, glazed in blue outside and in yellow inside.

29.7. Chinese, Sung dynasty. Chün ware. A flowerpot with 12 lobed sides and festooned rim; glazed in deep strawberry-red and blue.

29.12. Chinese, Sung dynasty. Chien ware (Honan type). A covered jar, glazed in black with a painted ornament in metallic brown.

29.13. Chinese, Sung dynasty. Tz'ŭ chou ware. A vase with trumpet-formed mouth, with a floral ornament in black on a white ground.

29.14. Chinese, Sung dynasty. Ying ching ware. A covered box, glazed in pale greenish-blue, with a stamped phoenix design on the cover in slight relief.

29.15. Chinese, T'ang dynasty. A figure of a dog, biting at one leg, seated on a hollow base; glazed in white with a mingled overflow of blue and yellow.

29.9. Persian, eleventh–thirteenth century. Rhages. A jug with a bottle neck, painted with figure designs, over glaze, in blue, green, black, and yellow.

29.10. Persian, eleventh–thirteenth century. Rhages. A jug with a wide cylindrical neck, glazed in white, and decorated in applied relief outlined with red, with other adornments of red, green, and blue enamels and gold.

29.11. West Asian. Rakka. A plate, glazed in white, with a sphinx figure in slight relief, enameled in green, dark blue, and brown.

SILVER

29.5. Chinese, ninth century. T'ang dynasty. A covered box, with a delicate floral design engraved upon it.

29.16. Chinese, ninth century. T'ang dynasty. A cup with a delicate floral design engraved upon the outside.

Curatorial work within the collection included documentary study of Chinese and Japanese inscriptions on several new purchases and on various objects already included in the collection. Many objects have been submitted for an expert opinion upon them or for translation of their Chinese, Japanese, or Tibetan inscriptions. The total number of such reports covers 681 objects and 56 photographs and tracings. The collection known as "A gold treasure of the late Roman period," a group of Byzantine objects of the fourth to sixth century, has been catalogued, and the collection of antique glass, which was listed in the Freer inventory, S. I. 189, as "Egyptian glass," has been classified for the first time and duly catalogued. This collection contains 1,271 manufactured objects, ranging from vases of several inches in height to minute beads and embracing

many types of early glass from Egypt, Syria, and elsewhere. In addition to these there are 80 small rods used in the making of mosaics, and 44 shells, probably from ancient graves and used as amulets, making a total of 1,395 objects. In this work the curator had the assistance of Dr. Gustavus A. Eisen, author of Glass, New York, 1927.

Repairs tending to the preservation of objects in the collection have been completed as follows:

(1) Resurfacing:
2 oil paintings by Whistler.
(2) Remounting:
1 Japanese screen.
1 Japanese panel.
2 Chinese *makimono*.
1 Chinese panel.
(3) Mending of breaks:
17 pieces of Chinese bronze.
7 pieces of Chinese jade.
5 pieces of Chinese pottery.
8 pieces of Egyptian glass.
1 piece of Egyptian bronze.
1 piece of Korean pottery.
1 piece of Japanese pottery.
2 pieces of Chinese stone sculpture.

These pieces were broken when purchased and have been put in condition for the first time.

Changes in exhibition during the year have involved 106 different objects, itemized as follows:

25 Chinese bronzes.
6 Chinese paintings.
2 Chinese stone sculptures.
28 Chinese pottery.
6 Japanese screens.
5 Japanese paintings.
15 Near Eastern pottery.
19 Near Eastern paintings.

THE LIBRARY

During the year there have been added to the main library 231 volumes and to the library of the field staff 114, making a total of 345 volumes; 41 unbound periodicals and 129 pamphlets to the main library and 53 periodicals and 62 pamphlets to the field library, making totals of 94 periodicals and 191 pamphlets. Thirty-four volumes of *Kokka* were rebound and 9 other volumes. The field library sent 39 volumes to the bindery. A list of new accessions to the library, in its two divisions, accompanies this report as Appendix A, Parts I and II (not printed).

REPRODUCTIONS AND PAMPHLETS

Two hundred and eighty-one new negatives of objects have been made. Of these, 139 were made for registration photographs and 142 in response to special orders. The total number of reproductions available, either as carbon photographs or as negatives from which prints can be made upon request, is now 2,689.

Three hundred and forty-two lantern slides have also been added to the collection, making a total of 829 available for study and for sale.

The total numbers of sales of reproductions, at cost price, are as follows: Photographs, 2,156; post cards, 18,334; lantern slides, 60; negatives, 5. Two hundred and eighty-five lantern slides have been loaned for lecture purposes.

Of booklets issued by the gallery, the following number were sold at cost price:

F. G. A. pamphlets	143
Synopsis of History folders	154
List of American paintings	69
Annotated Outlines of Study	21
Gallery books	277
Floor plans	17

BUILDING

The shop has been occupied constantly with the usual repair work, the making of stands, frames, and easels for exhibition galleries, and of furniture and equipment for the building. A detailed report of shopwork, including painting, accompanies this report as Appendix C (not printed).

ATTENDANCE

The gallery has been open every day, with the exception of Mondays, Christmas Day, and New Year's Day, from 9 until 4.30 o'clock. The total attendance for the year was 116,303. The aggregate Sunday attendance was 41,411, with an average Sunday attendance of 796. The week-day attendance amounted to 74,892, with an average of 290. Of the 2,101 visitors who came to the offices, 207 came for general information, 20 to study the building and museum methods, 54 to submit objects for examination, 327 to see objects in storage, 166 to study in the library, 75 to see the facsimiles of the Washington Manuscripts, 7 to make photographs and sketches in the exhibition galleries, 17 to make tracings from illustrated books in the library, and 228 to purchase photographs. Ten classes, in groups ranging in number from 3 to 15, were given instruction in the study rooms, and 12 groups ranging from 1 to 40 persons were given docent

service in the galleries. On November 19, 1928, Mr. Bishop lectured in the auditorium on The Development of Chinese Arts, with lantern-slide illustrations, before an audience composed of the art section of the Twentieth Century Club and the department of fine arts of the District Federation of Women's Clubs.

FIELD WORK

The work of the field staff has been carried on during the past year without interruption, in this country as well as in China, and gratifying progress has been made in both.

The labor involved has now reached very considerable portions and is steadily growing in amount. In addition to that of a routine nature, it has come to include the handling of a large correspondence with individuals and organizations in this country and abroad, the writing of articles and the delivering of lectures designed to promote an intelligent interest in the civilizations of the Far East, and the maintenance of a cordial understanding with the Chinese Government. Negotiations with the latter's National Research Institute have been brought to a highly satisfactory conclusion and have already borne abundant fruit. The plan inaugurated by the American Council of Learned Societies for the undertaking of a world-wide survey of the resources at present available for the prosecution of Far Eastern research has also received active assistance from our field staff and is to be put in execution in the near future.

Every effort has likewise been made to bring our field library of reference, with its books, periodicals, pamphlets, clippings, photographs, maps, etc., to a high state of efficiency and usefulness. The labor devoted to this task has already amply justified itself.

Dr. C. Li, of our field staff, who was in this country last summer, returned to China in the autumn by way of Europe, Egypt, and India. As a direct result of our understanding with the Chinese Government the latter extended to him on his arrival every assistance in the planning and prosecution of important archeological excavations in the Province of Honan, one of the principal centers of the archaic Chinese civilization of the protohistoric period. A full report of his finds during the past spring is awaited with interest and should throw much new light on a hitherto dark page of culture history.

It is highly gratifying to note that political conditions in China have undergone a steady improvement during the past year. All present indications appear to unite in justifying the confident expectation that our work in the field will be carried on without interference or interruption of any kind.

During the winter season Mr. Bishop gave the following lectures, in addition to that mentioned above:

Archeological Research in China, before the Cosmos Club, Washington, October 22.

Exploring and Excavating in China, at the Museum of the University of Pennsylvania, January 19.

The Bronze Age in China, at the Metropolitan Museum of Art, New York, on February 9.

Travels in China, at the Chevy Chase School, Chevy Chase, Md., March 3.

An account of the activities of our field staff, briefly outlined above, is given in detail in Appendix B, submitted herewith (not printed).

PERSONNEL

Mr. Archibald G. Wenley, field assistant, arrived from Paris, France, on September 21, and spent a few days at the gallery before going to Japan. The past eight months he has been stationed at Kyōto.

Dr. Chi Li arrived in Peking on November 21 and has since been engaged in archeological research.

Mr. Y. Kinoshita, of the Boston Museum of Fine Arts, worked at the gallery from January 14 to June 27 on the preservation of oriental paintings.

Mr. S. Mikami, of New York, worked at the gallery in three periods between March 25 and June 27 on repairs to various objects of jade, bronze, stone, glass, and pottery.

Dr. G. A. Eisen, of New York, spent two weeks in April at the gallery, classifying the collection of ancient glass.

Respectfully submitted.

J. E. Lodge,
Curator, Freer Gallery of Art.

Dr. C. G. Abbot,
Secretary of the Smithsonian Institution.

APPENDIX 4

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY

SIR: I have the honor to submit the following report on the field researches, office work, and other operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1929, conducted in accordance with the act of Congress approved May 16, 1928. The act referred to contains the following item:

> American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, the excavation and preservation of archeologic remains under the direction of the Smithsonian Institution, including necessary employees, the preparation of manuscript, drawings, and illustrations, the purchase of books and periodicals, and traveling expenses, $60,300.

Mr. M. W. Stirling entered upon his duties as chief of the bureau August 1, 1928, succeeding Dr. J. Walter Fewkes, who retired January 15, 1928.

During the months of September and October Mr. Stirling worked with a group of Acoma Indians who were visiting Washington and secured from them in as complete form as possible the origin and migration myth of that very conservative tribe. This myth not only describes the emergence of the first human beings from the underworld but also explains the origin and functions of the pantheon of demigods and heroes connected with the legend. The myth likewise explains the origin and function of the clans and the medicine societies and the reason for the many ceremonies practiced. In connection with this work phonographic records were made of 66 songs, many of which have been transcribed by Miss Frances Densmore, as described in her report. This information fills an important gap in our knowledge of the oldest inhabited pueblo in the United States.

Mr. Stirling spent the months of March and April in Florida, where a survey was made of the mounds in the vicinity of Tampa Bay. An interesting discovery was made of a series of mounds composed of mixed sand and shell, constructed at a distance of about 4 miles inland, parallel to the shore, and in each instance directly back of a large shell mound located on the salt water. Preliminary excavations were made at Cockroach Point, Palma Sola, and Safety Harbor. The shell mound at Cockroach Point is the largest on the west coast of Florida and is composed entirely of shell and bone, refuse from the meals of the Indians who formerly occupied the

site. Collections of shells and bones were made in the different levels of the mound, together with human artifacts associated with them, with a view to establishing a culture sequence.

The site at Safety Harbor was determined to be of the same culture as that excavated at Weeden Island during the winters of 1923 and 1924.

The large sand mound at Palma Sola proved to be of exceptional interest and was selected as a site for intensive excavation next winter.

During the latter part of April Mr. Stirling visited Chicago for the purpose of delivering lectures before the Geographic Society of Chicago and the anthropologists of Chicago and vicinity. From Chicago he went to Memphis, Tenn., where he attended the meeting of the Tennessee Academy of Sciences and addressed the society at their annual banquet. Proceeding from Memphis to Macon, Ga., he visited the large mounds on the site of Old Ocmulgee Town, traditional founding place of the Creek Confederacy.

During the third week in May Mr. Stirling attended the conference of Mid-Western Archeologists, which was held at St. Louis under the auspices of the National Research Council, and as representative of this body went to Montgomery, Ala., to deliver an address at the unveiling of a monument by the Alabama Anthropological Society on the site of old Tukabatchi.

He also attended the meeting of the American Association for the Advancement of Science in New York in December, 1928, as representative of the United States Government.

Dr. John R. Swanton, ethnologist, was engaged during the year in completing the proof reading of his bulletin on the Myths and Tales of the Southeast, which has been released for publication.

Considerable material was added to his manuscript paper entitled "Source Material for Choctaw Ethnology." Part of this was collected from the archives of the State Department of Archives and History at Jackson, Miss., and some from the eastern Choctaw at Philadelphia, Miss., in July, 1928. Also, a great deal more work was devoted to the projected tribal map of aboriginal North America north of Mexico and to the accompanying text, including the incorporation of some valuable notes furnished by Mr. Diamond Jenness, chief of the division of anthropology of the Geological Survey of Canada.

Work was continued throughout the year on the Timucua dictionary which, in spite of the elimination of a large number of cards on account of closer classification and the correction of errors, still fills 14 trays.

Shortly after July, 1928, Dr. Truman Michelson, ethnologist, left Washington to renew his research among the Algonquian Tribes of

Oklahoma. He first studied the linguistics, sociology, and physical anthropology of the Kickapoo. Kickapoo in certain respects is very important linguistically. While working on Arapaho he was able to formulate many phonetic shifts of complexity. Even so, the amount of vocabulary that can be proved to be Algonquian is very small. The grammatical structure is, however, fundamentally Algonquian. It is also true that there are a few traits which are distinctly un-Algonquian; for example, the order of words.

The first week in August Doctor Michelson went to Tama, Iowa, to renew his work among the Foxes. He there restored phonetically some texts previously obtained in the current syllabic script and worked out some translations. He also obtained some grammatical notes on these texts. Some new Fox syllabic texts were collected and new and important ethnological data were obtained.

Doctor Michelson returned to Washington in September. He corrected proofs of Bulletin 89, Observations on the Thunder Dance of the Bear Gens of the Fox Indians, and prepared for publication by the bureau a memoir entitled "Notes on the Great Sacred Pack of the Thunder Gens of the Fox Indians." Early in June Doctor Michelson left for Oklahoma, where he obtained more Kickapoo linguistic notes, further elucidating the relation of Kickapoo to Fox. From this it appears that Kickapoo diverges more widely in idiom than hitherto suspected. He also secured some Kickapoo texts in the current syllabic script and obtained new data on social organization. Some brief Shawnee linguistic notes were collected. These show that while Shawnee is in certain respects very important for a correct understanding of Fox phonology, as a whole it is not as archaic. It is also now clear that Shawnee is further removed from Sauk and Kickapoo than he had previously surmised. Doctor Michelson witnessed several Kickapoo dances and attended a Shawnee ball game.

In June, 1929, Mr. John P. Harrington, ethnologist, completed his report on the Taos Indians, who inhabit a large pueblo on an eastern affluent of the Rio Grande in north-central New Mexico. These are the northernmost of the New Mexico Pueblo Indians and are peculiarly interesting because of the long intimate relations they have had with the Jicarilla Apaches, Utes, Comanches, and other tribes of Great Plains culture. During the period of Spanish domination in New Mexico the Taos had to play the double and difficult rôle, because of their frontier position, of persuading the Spanish that they were really on their side, and the Plains Indians that they were really on theirs. The relations with the Plains Indians existed far back in Taos history and amounted at times to the incorporation of large bodies of these Indians in the blood which went to make up the present-day Taos. And there is a still more remote

and fundamental connection with one group of Plains Indians, namely, the Kiowa. The Taos language, which was the language of one of the ancient groups which contributed to the composition of Taos, has been determined to be a dialect of Kiowa, which seems to indicate that this contingent of the Taos population at least, like the Kiowas themselves, once lived in the northern region of the Rocky Mountains, probably in what is now Canada.

Grasping still another opportunity to check the old and new information on this region, studies on the related Karuk Indians of the central Klamath River region of California were resumed during field work on the coast and were continued throughout the year, resulting in an accumulation of carefully analyzed material, a large part of which is now ready for publication. The work consists of many divisions of information, including the grammar of the language, its sounds, its peculiar musical intonations, and the system of long and short consonants and vowels; the history of the tribe, which remained intact and unspoiled up to 1850; the census, with the peculiar old personal names; the villages, which were strung out along the river and its tributary creeks; the construction of the living houses and sweat houses, and the description of all the manufactures, and the process of making the objects, all in Indian; the social life, an organization without chiefs; the great festivals and the various dances; feuds, wars, and peace making; sucking and herb doctors, and the sources of their power; medicine formulas and myths, all in the language, for any other record of them would be inadequate. This information is accompanied by photographs and phonograph records and is rapidly approaching completion for publication as a report of the bureau.

Early in June Mr. Harrington went to Chaco Canyon, N. Mex., for the purpose of making further study of the Pueblo Indian languages, notably the relation of Zuñi and Keresan to the newly discovered Kiowan family. Cooperating with students of the University of New Mexico attending the university summer school being held at Chaco Canyon under the joint auspices of the State University and the School of American Research, a minute comparison was made of the Taos and Zuñi languages, resulting in the discovery of the genetic relationship of these two languages, a relationship which can be traced through hundreds of words of similar sound and identical construction, which was long ago hinted at by the discovery of such words as *lana*, big, and *papa*, older brother, which are the same in sound and meaning in both languages. About 200 kymograph tracings were made. Similar genetically related words and features were also discovered in the Keresan language. Cooperating in this work were Miss Sara Goddard, Miss Clara Leibold, Miss Anna

Risser, Miss Janet Tietjens, Miss Winifred Stamm, Mr. Reginald Fisher, and several other students. The results are ready for publication, including the kymographic alphabet, which is mounted and ready for the engraver.

The months of July and August, 1928, were spent by Dr. F. H. H. Roberts, jr., archeologist, in completing archeological investigations along the Piedra River in southwestern Colorado. During that time the remains of 50 houses belonging to the first period of the prehistoric Pueblo peoples were excavated and examined. As a result of those researches it was possible to determine a 3-stage chronological development of the house types in the district as well as to postulate very definite reconstructions of the dwellings. An additional discovery was that in the arrangement of the structures the builders had developed the prototype of the unit house which was the characteristic building of the following stage, the Pueblo II period. Besides the work in house remains, a number of burial mounds were explored and many skeletons and objects of the material culture of the people were obtained. The latter include a large number and variety of pottery specimens, many of which represent an entirely new feature in the ceramic industry, bone and stone implements, and ornaments. The work as a whole gives a clear-cut picture of the life and conditions prevailing at a time of instability and disturbance due to an influx of new peoples, with its attendant cultural transition.

On the completion of the work along the Piedra River one week was spent in a reconnaissance of the Governador district in northern New Mexico. The Governador region includes the Governador, Burns, La Jara, and Frances Canyons. The latter are of special archeological and ethnological interest, because it was to that section that a large group of the Pueblo Indians from the Jemez villages fled after they had been disastrously defeated in the Battle of San Diego Canyon during the month of June, 1696, by Spanish forces engaged in the reconquest of the Southwest. The ruins of the dwellings built by the refugees are in a good state of preservation and furnish excellent information on the methods and styles of house building prevalent at that time. At the close of the Governador explorations Doctor Roberts returned to Washington, reaching there the middle of September.

During the autumn illustrations were prepared to accompany a manuscript entitled "Recent Archeological Developments in the Vicinity of El Paso, Tex.," which was published in January, 1929, as volume 81, No. 7, of the Smithsonian Miscellaneous Collections. Proof of another paper entitled "Shabik'eshchee Village, A Late Basket Maker Site in the Chaco Canyon, New Mexico," was corrected,

and this appeared in June, 1929, as Bulletin 92 of the Bureau of American Ethnology.

Considerable time was spent in the laboratory of the division of American archeology of the United States National Museum in working over the collection made during the excavations along the Piedra River. A portion of this work included the restoration, from fragments found in the various houses, of a number of unusually fine culinary and storage jars and a series of decorated bowls.

From January to June a 545-page manuscript on the work in southwestern Colorado was prepared. Accompanying this report are 40 text figures drawn by Doctor Roberts. The figures include 64 drawings, consisting of maps of the San Juan archeological area and the Piedra district, outlines of the various village and house groups, restorations of the different forms of dwellings, details in building construction, outline groups of pottery forms, and designs from decorated ceramic containers.

On May 11, 1929, Doctor Roberts left Washington for Denver, Colo., where one week was spent in studying museum specimens. From Denver he proceeded to Gallup, N. Mex., where he outfitted for work in the region of the Long H Ranch, eastern Arizona, 45 miles from the Pueblo of Zuñi. After conducting a reconnaissance a site was chosen on the Long H Ranch, 1 mile northwest of the ranch buildings, and a series of excavations started. As work progressed it was found that the site was one which had been occupied by Basket Maker III and Pueblo I peoples and that it showed the transition from the one period to the other. At the end of June, eight fine examples of pit houses had been uncovered. Excellent data on the type and character of this form of structure were obtained and several new features in the method of house grouping were observed. The burial mounds of three house clusters were examined and 30 interments exhumed. The latter were accompanied by mortuary offerings of pottery; bone and shell implements; shell beads, bracelets, and pendants; and turquoise ornaments. With the various objects found in the houses the total number of specimens reaches 300. The work has furnished valuable information on a little-known phase of the prehistoric sedentary cultures of the Southwest.

During the year Mr. J. N. B. Hewitt, ethnologist, continued his studies on the Iroquois. In 1900 and immediately subsequent years Mr. Hewitt undertook seriously to record in native texts the extant rituals, ordinances, and laws pertaining to the institutions and structure of the League or Confederation of the Five (later Six) Tribes or Nations of the Iroquois of New York State. At that time there were still living two or three men among the Iroquois of Canada who grasped more or less fully the intent and purpose of the various

institutions of this league, and Mr. Hewitt had then acquired a conversational knowledge of the two languages in which these rituals, ordinances, and laws were chiefly expressed, to wit, the Mohawk and the Onondaga. The use of the Cayuga, Oneida, and Seneca was exceptional.

From these men Mr. Hewitt obtained standard texts in the native tongues of the informants. The death of two of these informants made a study of the material furnished by them difficult. Resort was had then to other less noted informants in these matters, and there was obtained a large number of versions of portions of the standard texts already mentioned, which disclosed views and statements which it seemed impossible to harmonize with those appearing in the standard texts. It was imperative that the value of these discordant statements should be ascertained where possible and that palpable omissions from the standard texts should be utilized. The task was to ascertain in these analytical studies what was transmitted tradition and what was the personal opinion of the informant, unwittingly expressed.

This work of comparison was undertaken to secure the best possible translations, interlinear and free, of the several native texts thus studied. The texts of the Installation Chant, the Eulogy of the Founders, of the Traditional Biography of Deganawida which describes in great detail the years of difficult work which had to be done to establish the League of the Five Tribes of the Iroquois in the Stone Age of America, and also the native text of the Requickening Address of Installation, were subjected to this kind of study.

Mr. Hewitt represented the Smithsonian Institution on the United States Geographic Board. In addition to attending the meetings, he spent about three days in researches for the executive committee.

As custodian of manuscripts of the bureau, Mr. Hewitt did some classificatory linguistic work on new items acquired.

Mr. Hewitt left Washington on May 6, 1929, to continue his studies among the Iroquoian Tribes dwelling in Canada and in the State of New York. His work consisted chiefly in literal and free translation of formal native diction embodying legislative, ritualistic, and forensic thought; and also in the coordination of divergent traditional statements of traditionally historical events, in eliminating the incongruous, and in conserving the congruous. He secured 15 parcels of wampum strings, severally bearing the name of one of the burdens of the ritual, the Requickening Address of Installation.

Dr. Francis La Flesche, ethnologist, during the last fiscal year completed Wa-sha′-be A-thi^{n}, an Osage war ceremony, composed of 270 pages of manuscript, with diagrams and illustrations; also the Wa′-wa-tho^{n}, a ceremony pertaining to the peace pipes, composed

of 129 pages of manuscript, with illustrations. In this paper is a full and detailed description of the discoidal pipes, ancient and modern, found in the Eastern States, many of which may be found in the various museums.

With the assistance of Mrs. Grace D. Woodburn, he has revised the work on the Osage Dictionary. There are approximately 19,000 words of the Osage language in common use among the tribe with English equivalent; about 17,000 English words with Osage transcriptions are given. The words, with their meanings, can not be given positively, but a clear idea of usage has been made. About 35 illustrations have been completed for this work.

SPECIAL RESEARCHES

The study of Indian music has been continued during the past year by Miss Frances Densmore, a collaborator of the bureau. Material has been submitted on the songs of the Menominee, Winnebago, Pawnee, Yuma, Acoma, and the Indians living on the Fraser, Thompson, and Squamish Rivers in British Columbia; also on a small group of songs recorded at Anvik, Alaska, and obtained through the courtesy of Rev. John W. Chapman. A comparison of the songs in this wide territory has been important in the development of the research.

Eight manuscripts have been submitted with the following titles: "Menominee Songs of Pleasure, Dances, and Manabus Legends"; "Songs of Indians Living on the Fraser, Thompson, and Squamish Rivers in British Columbia"; "Origin Song of the Dice Game and Other Winnebago Songs"; "Winnebago Songs Connected with the Recent War"; and 17 analytical tables comparing Pawnee with songs previously analyzed; "Winnebago Songs Connected with Legends, Games, and Dances"; "Acoma Songs of the Flower Dance and Corn Dance"; "Acoma Songs Used in Treating the Sick and Other Acoma Songs"; and "A Comparison Between Yuma, Acoma, and Alaskan Indian Songs," with 18 tables of analysis of Yuma songs. The number of songs transcribed and analyzed is 117, and a large number of dictaphone song records were studied without transcription. Miss Densmore corrected the proof of her book on Papago Music and the galleys of Pawnee Music; the final work of preparing the Pawnee material for publication was also done during this year. A large amount of work was done upon the preparation of Menominee and Yuma material for publications. Catalogue numbers have been assigned to all transcribed songs, except the Acoma, the highest catalogue number in her series being 1848.

During August and September, 1928, a field trip was made to the Winnebago and Menominee Tribes in Wisconsin. A large dance,

continuing three days, was held by the Winnebago near Black River Falls. This dance was witnessed, as well as numerous incidents of life in the camp, and about 50 photographs were taken.

At the conclusion of this gathering Miss Densmore went to Keshena, Wis., for further work among the Menominee. The manuscript already prepared was read to reliable members of the tribe and details were added. An interesting opportunity for seeing Menominee dances was afforded by the annual Indian fair which continued four days. Among the old dances presented were those in imitation of the fish, frog, crawfish, rabbit, partridge, and owl. The songs of these dances, together with their action and origin, were recorded. The Manabus legend concerning the first death was obtained, together with its songs, and the work included the recording of other old material.

A drum-presentation ceremonial dance, commonly called a dream dance, was held at the native village of Zoar on September 2 to 5. This was attended each day and closely observed, Miss Densmore remaining 10 hours beside the dance circle on the third day of the ceremony. Many photographs were taken.

On September 14 Miss Densmore proceeded to Tomah, Wis., and resumed her study of Winnebago music. Additional songs of the war-bundle feast, also called the winter feast, were recorded, together with several old legends and their songs, and the origin of the bowl-and-dice game, with its song. The legend of this game origin had previously been obtained among the Menominee. Numerous photographs were taken, and two drumming sticks were obtained, one being decorated with otter fur and used a generation ago by the leader at the drum.

During October, 1928, Miss Densmore went to Washington, D. C., and recorded 27 Acoma songs from Philip Sanche, who, with several Acoma Indians, was engaged in work for the chief of the Bureau of American Ethnology. A larger number of Acoma songs had previously been recorded for the chief of the bureau and these records were studied, 16 being transcribed as representative examples.

EDITORIAL WORK AND PUBLICATIONS

The editing of the publications of the bureau was continued through the year by Mr. Stanley Searles, editor, assisted by Mrs. Frances S. Nichols, editorial assistant. The status of the publications is presented in the following summary:

PUBLICATIONS ISSUED

Forty-first Annual Report. Accompanying papers: Coiled Basketry in British Columbia and Surrounding Region (Boas, assisted by Haeberlin, Teit, and Roberts); Two Prehistoric Villages in Middle Tennessee (Myer). 626 pp. 137 pls. 200 figs. 1 pocket map.

Forty-third Annual Report. Accompanying papers: The Osage Tribe: Two Versions of the Child-naming Rite (La Flesche); Wawenock Myth Texts from Maine (Speck); Native Tribes and Dialects of Connecticut, a Mohegan-Pequot Diary (Speck); Picuris Children's Stories (Harrington and Roberts); Iroquoian Cosmology—Second Part (Hewitt). 828 pp. 44 pls. 9 figs.

Forty-fourth Annual Report. Accompanying papers: Exploration of the Burton Mound at Santa Barbara, Calif. (Harrington); Social and Religious Beliefs and Usages of the Chickasaw Indians (Swanton); Uses of Plants by the Chippewa Indians (Densmore): Archeological Investigations—II (Fowke). 555 pp. 98 pls. 16 figs.

Bulletin 84. Vocabulary of the Kiowa Language (Harrington). 255 pp. 1 fig.

Bulletin 86. Chippewa Customs (Densmore). 204 pp. 90 pls. 27 figs.

Bulletin 87. Notes on the Buffalo-head Dance of the Thunder Gens of the Fox Indians (Michelson). 94 pp. 1 fig.

Bulletin 89. Observations on the Thunder Dance of the Bear Gens of the Fox Indians (Michelson). 73 pp. 1 fig.

Bulletin 92. Shabik' eshchee Village: A Late Basket Maker Site in the Chaco Canyon, New Mexico (Roberts). 164 pp. 31 pls. 32 figs.

PUBLICATIONS IN PRESS

Forty-fifth Annual Report. Accompanying papers: The Salishan Tribes of the Western Plateaus (Teit, edited by Boas); Tattooing and Face and Body Painting of the Thompson Indians, British Columbia (Teit, edited by Boas); The Ethnobotany of the Thompson Indians of British Columbia (Teit, edited by Steedman); The Osage Tribe: Rite of the Wa-xo'-be (La Flesche).

Bulletin 88. Myths and Tales of the Southeastern Indians (Swanton).

Bulletin 90. Papago Music (Densmore).

Bulletin 91. Additional Studies of the Arts, Crafts, and Customs of the Guiana Indians, with special reference to those of Southeastern British Guiana (Roth).

Bulletin 93. Pawnee Music (Densmore).

DISTRIBUTION OF PUBLICATIONS

The distribution of the publications of the bureau has been continued under the charge of Miss Helen Munroe, assisted by Miss Emma B. Powers. Publications were distributed as follows:

Report volumes and separates	7,605
Bulletins and separates	11,890
Contributions to North American Ethnology	34
Miscellaneous publications	583
Total	20,112

This is an increase of 10,986 publications distributed, due to the fact that five more publications were distributed to the mailing list than in the previous year. The mailing list, after revision during the year, stands at 1,642.

ILLUSTRATIONS

Following is a summary of work accomplished in the illustration branch of the bureau under the supervision of Mr. De Lancey Gill, illustrator:

Photographs retouched and lettered and drawings made ready for engraving	874
Drawings prepared, including maps, diagrams, etc	53
Engravers' proofs criticized	690
Printed editions of colored plates examined at Government Printing Office	23,000
Correspondence attended to	125
Photographic laboratory work by Dr. A. J. Olmsted, National Museum, in cooperation with the Bureau of American Ethnology:	
Negatives	143
Prints	275
Films developed from field exposures	12

LIBRARY

The reference library has continued under the care of Miss Ella Leary, librarian, assisted by Mr. Thomas Blackwell. The library consists of 28,512 volumes, about 16,377 pamphlets, and several thousand unbound periodicals. During the year 591 books were accessioned, of which 112 were acquired by purchase and 479 by gift and exchange; also 200 pamphlets and 4,100 serials, chiefly the publications of learned societies, were received and recorded, of which only 112 were obtained by purchase, the remainder being received through exchange. The catalogue was increased by the addition of 1,400 cards. Many books were loaned to other libraries in Washington. In addition to the constant drafts on the library of the bureau, requisition was made on the Library of Congress during the year for an aggregate of 200 volumes for official use, and in turn the bureau library was frequently consulted by officers of other Government establishments, as well as by students not connected with the Smithsonian Institution.

While many volumes are still without binding, the condition of the library in this respect has greatly improved during the last few years; 431 volumes were bound during the year.

COLLECTIONS

100,592. Several thousand anthropological specimens and small collections of mammals, plants, mollusks, and minerals from various localities in Alaska, secured by Henry B. Collins, jr., during 1928. (3,730 specimens.)

102,768. Small collection of archeological objects gathered by Charles T. Earle at an aboriginal camp site at Shaws Point, Fla. (26 specimens.)

102,769. Two textile fragments collected in the Canyon de Chelly, Ariz., by Dr. W. H. Spinks. (2 specimens.)

102,896. Collection of 61 ethnological specimens secured from the Hupa Indians of California by E. G. Johnson. (61 specimens.)

103,344. Two specimens of sheet mica collected from unidentified mounds in Ohio by the late Dr. E. H. Davis and presented to the bureau by Miss Betsey B. Davis. (2 specimens.)

103,964. Pair of charms used by the Karuk Indians of northern California to ward off pains and bewitchments. Made by Mrs. Phoebe Maddux, of the Karuk Tribe. (2 specimens.)

105,865. Collection of ethnological objects gathered from the Hupa Indians of California by E. G. Johnson and purchased from him by the bureau. (27 specimens.)

PROPERTY

Office equipment was purchased to the amount of $292.70.

MISCELLANEOUS

The correspondence and other clerical work of the office has been conducted by Miss May S. Clark, clerk to the chief, assisted by Mr. Anthony W. Wilding, assistant clerk. Miss Mae W. Tucker, stenographer, assisted Dr. John R. Swanton in his work of compiling a dictionary of the Atakapa and compiled two catalogues of the manuscripts in the archives of the bureau—one arranged according to author and the other numerically. Mrs. Frances S. Nichols assisted the editor.

During the course of the year information was furnished by members of the staff in reply to numerous inquiries concerning the North American Indian peoples, both past and present, and the Mexican peoples of the prehistoric and early historic periods to the south. Various specimens sent to the bureau were identified and data on them furnished for their owners.

Personnel.—Mr. M. W. Stirling was appointed chief of the bureau August 1, 1928. Dr. J. Walter Fewkes retired as associate anthropologist of the bureau November 14, 1928.

Respectfully submitted.

M. W. Stirling, *Chief.*

Dr. C. G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 5

REPORT ON THE INTERNATIONAL EXCHANGE SERVICE

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1929:

The appropriation made by Congress for the support of the Exchange Service for 1929 was $50,355, an increase of $3,500 over the amount for the preceding year. Of this increase, $2,147 was provided for in a deficiency bill to cover the additional sum required to meet the provisions of the Welch Act amending the classification act of 1923, $1,000 to meet the extra cost for freight, and $353 to advance to the next step in their respective grades those of the employees of the exchange office eligible for promotion.

The total number of packages handled was 620,485, an increase of 78,262 over the previous year. This is the second largest increase in the number of packages passing through the service in any one year since its organization in 1850. The greatest increase in packages was in 1927, when it was over 100,000. The total weight of the packages handled was 621,373 pounds, an increase of 27,252.

The number and weight of the packages of different classes are given in the following table:

	Packages		Weight	
	Sent	Received	Sent	Received
			Pounds	*Pounds*
United States parliamentary documents sent abroad	239,096		102,404	
Publications received in return for parliamentary documents		5,773		23,051
United States departmental documents sent abroad	183,576		152,696	
Publications received in return for departmental documents		5,698		23,671
Miscellaneous scientific and literary publications sent abroad	139,520		216,785	
Miscellaneous scientific and literary publications received from abroad for distribution in the United States		46,822		102,766
Total	562,192	58,293	471,885	149,488
Grand total	620,485		621,373	

It will be observed from the above table that many more packages are sent abroad than are received, yet the disparity is not as great as appears from the figures. Packages sent abroad in many

instances contain only a single publication, while those received in return often comprise several volumes. Furthermore, a number of foreign correspondents forward their publications directly to their destinations in this country by mail.

During the year there were shipped abroad 2,823 boxes, a decrease of 49 from the number sent last year, although the total weight of the consignments shipped to foreign countries was practically the same for the two years. Of the total number of boxes shipped abroad 604 contained full sets of United States official documents

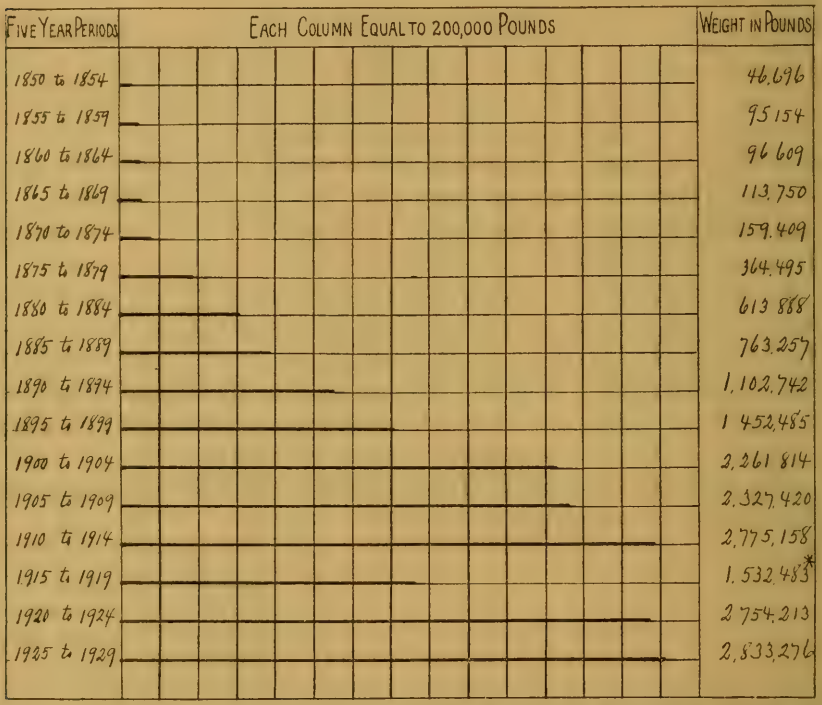

Figure 1.—Diagram showing the relative weight of packages transmitted through the International Exchange Service between the years 1850 and 1929, divided into periods of five years each

for foreign depositories and 2,219 included departmental and other publications for the depositories of partial sets and for miscellaneous establishments and individuals.

In addition to the forwarding of consignments to foreign exchange agencies in boxes, it is necessary, for the reasons given in previous reports, to mail a number of packages directly to their destinations. There were forwarded in this manner during the year 60,856 packages.

The number of boxes sent to each foreign country is given in the following table:

Consignments of exchanges forwarded to foreign countries

Country	Number of boxes	Country	Number of boxes
Argentina	57	Latvia	11
Austria	58	Mexico	11
Belgium	64	Netherlands	85
Brazil	40	New South Wales	37
Bulgaria	2	New Zealand	26
British Colonies	14	Norway	55
Canada	44	Palestine	106
Chile	25	Peru	21
China	91	Poland	45
Colombia	22	Portugal	24
Costa Rica	22	Queensland	31
Cuba	11	Rumania	24
Czechoslovakia	64	Russia	133
Denmark	49	South Australia	25
Egypt	19	Spain	38
Estonia	35	Sweden	69
Finland	14	Switzerland	77
France	174	Tasmania	23
Germany	330	Turkey	11
Great Britain and Ireland	382	Union of South Africa	36
Greece	4	Uruguay	20
Haiti	3	Venezuela	21
Honduras	2	Victoria	51
Hungary	35	Western Australia	23
India	54	Yugoslavia	16
Italy	102		
Japan	87	Total	2,823

For many years prior to 1926 the interchange of publications between China and the United States was conducted under the direction of the Shanghai Bureau of Foreign Affairs. The Chinese Bureau of Exchanges was under the direction of the Ministry of Education at Peking from May, 1926, to June, 1928, when operations were suspended owing to the reorganization of the Chinese Government. The Metropolitan Library, in which was then deposited the full series of United States governmental documents sent to China, temporarily took over the work of the bureau. The exchange work was carried on by that library until February, 1929, when a communication was received from the National Research Institute, 205 Avenue du Roi Albert, Shanghai, stating that the Nationalist Government had transferred the Bureau of International Exchanges from Peking to Shanghai and had placed the bureau under its direction. Shipments therefore have been made in care of the National Research Institute since March, 1929.

In June, 1925, the Egyptian Government, which had not at that time become a party to the Brussels convention, discontinued its exchange bureau in the Government Publications Office, and it was necessary to send packages intended for correspondents in Egypt directly to their destinations by mail. In June, 1927, as stated in the

report for that year, the Egyptian Government formally adhered to the Brussels convention and established as its agency the Bureau of Publications under the Ministry of Finances at Cairo. Complete arrangements for the taking over of the exchange work by that bureau, however, were not perfected until September, 1928, when shipments in boxes to Egypt were resumed.

A few days after the close of the fiscal year the Government printer of South Australia advised the Institution that his Government, at the invitation of the League of Nations, had established under his direction the South Australian Government Exchanges Bureau to take over the exchange work conducted for many years by the Public Library of South Australia.

FOREIGN DEPOSITORIES OF GOVERNMENTAL DOCUMENTS

There has been no increase in the number of sets of United States governmental documents forwarded to foreign depositories, the total number being 105. However, there has been a change in the number of depositories of the full and partial sets, two of the latter, those for Latvia and Rumania, having been increased to full sets. The number of full sets, therefore, is now 62 and partial sets 43.

At the request of the German Government the depository of American official documents has been changed from the Deutsche Reichstags-Bibliothek to the Reichstauschstelle im Reichsministerium des Innern, Berlin.

The partial set depository in Guatemala has been changed from the Secretary to the Government to the Secretaria de Relaciones Exteriores de la Republica de Guatemala; and the depository in Honduras from the Secretary of the Government to Ministerio de Relaciones Exteriores.

The depository of the full set of governmental documents sent to Italy has been changed from the Biblioteca Nazionale Vittorio Emanuele to the Ministero della Pubblica Istruzione, Viale del Re, Rome.

The Nationalist Government of China has changed the depository of United States official documents in that country from the Metropolitan Library in Peking to the Ministry of Foreign Affairs at Nanking.

A list of the foreign depositories is given below:

DEPOSITORIES OF FULL SETS

ARGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.

BUENOS AIRES: Biblioteca de la Universidad Nacional de La Plata, La Plata. (Depository of the Province of Buenos Aires.)

AUSTRALIA: Library of the Commonwealth Parliament, Canberra.
NEW SOUTH WALES: Public Library of New South Wales, Sydney.
QUEENSLAND: Parliamentary Library, Brisbane.
SOUTH AUSTRALIA: Parliamentary Library, Adelaide.
TASMANIA: Parliamentary Library, Hobart.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
AUSTRIA: Bundesamt für Statistik, Schwarzenbergstrasse 5, Vienna I.
BELGIUM: Bibliothèque Royale, Brussels.
BRAZIL: Bibliotheca Nacional, Rio de Janeiro.
CANADA: Library of Parliament, Ottawa.
MANITOBA: Provincial Library, Winnipeg.
ONTARIO: Legislative Library, Toronto.
QUEBEC: Library of the Legislature of the Province of Quebec, Quebec.
CHILE: Biblioteca del Congreso Nacional, Santiago.
CHINA: Ministry of Foreign Affairs, Nanking.
COLOMBIA: Biblioteca Nacional, Bogotá.
COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
CUBA: Secretaría de Estado (Asuntos Generales y Canje Internacional), Habana.
CZECHOSLOVAKIA: Bibliothèque de l'Assemblée Nationale, Prague.
DENMARK: Kongelige Bibliotheket, Copenhagen.
EGYPT: Bureau des Publications, Ministère des Finances, Cairo.
ESTONIA: Riigiraamatukogu (State Library), Tallinn (Reval).
FRANCE: Bibliothèque Nationale, Paris.
PARIS: Préfecture de la Seine.
GERMANY: Reichstauschstelle im Reichsministerium des Innern, Berlin C 2.
BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the State of Baden.)
BAVARIA: Bayerische Staatsbibliothek, Munich.
PRUSSIA: Preussische Staatsbibliothek, Berlin, N. W. 7.
SAXONY: Sächsische Landesbibliothek, Dresden—N. 6.
WURTEMBERG: Landesbibliothek, Stuttgart.
GREAT BRITAIN:
ENGLAND: British Museum, London.
GLASGOW: City Librarian, Mitchell Library, Glasgow.
LONDON: London School of Economics and Political Science. (Depository of the London County Council.)
GREECE: Bibliothèque Nationale, Athens.
HUNGARY: Hungarian House of Delegates, Budapest.
INDIA: Imperial Library, Calcutta.
IRISH FREE STATE: National Library of Ireland, Dublin.
ITALY: Ministero della Pubblica Istruzione, Rome.
JAPAN: Imperial Library of Japan, Tokyo.
LATVIA: Bibliothèque d'Etat, Riga.
MEXICO: Biblioteca Nacional, Mexico, D. F.
NETHERLANDS: Royal Library, The Hague.
NEW ZEALAND: General Assembly Library, Wellington.
NORTHERN IRELAND: Ministry of Finance, Belfast.
NORWAY: Universitets-Bibliotek, Oslo. (Depository of the Government of Norway.)

PERU: Biblioteca Nacional, Lima.
POLAND: Bibliothèque du Ministère des Affaires Étrangères, Warsaw.
PORTUGAL: Biblioteca Nacional, Lisbon.

DEPOSITORIES OF PARTIAL SETS

AUSTRIA:
VIENNA: Wiener Magistrat.
BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
BRAZIL:
MINAS GERAES: Directoria Geral de Estatistica em Minas, Bello Horizonte, Minas Geraes.
RIO DE JANEIRO: Bibliotheca da Assemblea Legislativa do Estado, Nictheroy.
CANADA:
ALBERTA: Provincial Library, Edmonton.
BRITISH COLUMBIA: Legislative Library, Victoria.
NEW BRUNSWICK: Legislative Library, Fredericton.
NOVA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
PRINCE EDWARD ISLAND: Legislative Library, Charlottetown.
SASKATCHEWAN: Government Library, Regina.
BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
BULGARIA: Ministère des Affaires Étrangères, Sofia.
CEYLON: Colonial Secretary's Office (Record Department of the Library), Colombo.
DANZIG: Stadtbibliothek, Free City of Danzig.
DOMINICAN REPUBLIC: Biblioteca del Senado, Santo Domingo.
ECUADOR: Biblioteca Nacional, Quito.
FINLAND: Parliamentary Library, Helsingfors.
FRANCE:
ALSACE-LORRAINE: Bibliothèque Universitaire et Régionale de Strasbourg, Strasbourg.
GERMANY:
BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
HAMBURG: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
HESSE: Landesbibliothek, Darmstadt.
LÜBECK: President of the Senate.
THURINGIA: Rothenberg-Bibliothek, Landesuniversität, Jena.
GUATEMALA: Secretaria de Relaciones Exteriores de la República de Guatemala.
HAITI: Secrétaire d'État des Relations Extérieures, Port au Prince.
HONDURAS: Ministerio de Relaciones Exteriores, Tegucigalpa.
ICELAND: National Library, Reykjavik.
INDIA:
BOMBAY: Undersecretary to the Government of Bombay, General Department, Bombay.
BURMA: Secretary to the Government of Burma, Education Department, Rangoon.
MADRAS: Chief Secretary to the Government of Madras, Public Department, Madras.
UNITED PROVINCES OF AGRA AND OUDH: University of Allahabad, Allahabad.
JAMAICA: Colonial Secretary, Kingston.
LIBERIA: Department of State, Monrovia.
LITHUANIA: Ministère des Affaires Étrangères, Kaunas (Kovno).

LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
MALTA: Minister for the Treasury, Valetta.
NEWFOUNDLAND: Colonial Secretary, St. John's.
NICARAGUA: Superintendente de Archivos Nacionales, Managua.
PANAMA: Secretaría de Relaciones Exteriores, Panama.
PARAGUAY: Sección Canje Internacional de Publicaciones del Ministerio de Relaciones Exteriores, Estrella 563, Asunción.
RUMANIA: Academia Română, Bucharest.
RUSSIA: Shipments temporarily suspended.
SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
SIAM: Department of Foreign Affairs, Bangkok.
STRAITS SETTLEMENTS: Colonial Secretary, Singapore.
SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
SWEDEN: Kungliga Biblioteket, Stockholm.
SWITZERLAND: Bibliothèque Centrale Fédérale, Berne.
SWITZERLAND: Library of the League of Nations, Geneva.
TURKEY: Ministère de l'Instruction Publique, Angora.
UNION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
YUGOSLAVIA: Ministère de l'Education, Belgrade.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNAL

The total number of establishments to which the daily issue of the Congressional Record is forwarded is 101, the same as last year.

The second convention concluded at Brussels in March, 1886, provided not only for the immediate exchange of the official journal but for the parliamentary annals and documents as well. Heretofore, however, the countries taking part in this interparliamentary exchange have restricted it to the official journal. During the year the French Chamber of Deputies, to which the Congressional Record has been forwarded for some time, proposed to this Government that the full provisions of the convention be entered into between France and the United States. This proposal was accepted, and there is now forwarded to the French Chamber direct by mail, immediately upon publication, the bills, reports, documents, and slip laws of both the Senate and House of Representatives.

There is given below a complete list of the countries now taking part in the immediate exchange, together with the names of the establishments to which the Record is forwarded:

DEPOSITORIES OF CONGRESSIONAL RECORD

ARGENTINA:
Biblioteca del Congreso Nacional, Buenos Aires.
Cámara de Diputados, Oficina de Información Parlamentaria, Buenos Aires.
Buenos Aires; Biblioteca del Senado de la Provincia de Buenos Aires, La Plata.

AUSTRALIA:
Library of the Commonwealth Parliament, Canberra.
New South Wales: Library of Parliament of New South Wales, Sydney.
Queensland: Chief Secretary's Office, Brisbane.
Western Australia: Library of Parliament of Western Australia, Perth.
AUSTRIA: Bibliothek des Nationalrates, Vienna I.
BELGIUM: Bibliothèque de la Chambre des Représentants, Brussels.
BOLIVIA: Biblioteca del H. Congreso Nacional, La Paz.
BRAZIL:
Bibliotheca do Congresso Nacional, Rio de Janeiro.
Amazonas: Archivo, Bibliotheca e Imprensa Publica, Manáos.
Bahia: Governador do Estado de Bahia, São Salvador.
Espirito Santo: Presidencia do Estado do Espirito Santo, Victoria.
Sergipe: Director da Imprensa Official, Aracaju, Estado de Sergipe.
São Paulo: Diario Official do Estado de São Paulo, São Paulo.
CANADA:
Library of Parliament, Ottawa.
Clerk of the Senate, Houses of Parliament, Ottawa.
CHINA: Metropolitan Library, Pei Hai, Peking.
COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
CUBA:
Biblioteca de la Cámara de Representantes, Habana.
Biblioteca del Senado, Habana.
CZECHOSLOVAKIA: Bibliothèque de l'Assemblée Nationale, Prague.
DANZIG: Stadtbibliothek, Danzig.
DENMARK: Rigsdagens Bureau, Copenhagen.
DOMINICAN REPUBLIC: Biblioteca del Senado, Santo Domingo.
DUTCH EAST INDIES: Volksraad von Nederlandsch-Indië, Batavia, Java.
EGYPT: Bureau des Publications, Ministère des Finances, Cairo.
ESTONIA: Riigiraamatukogu (State Library), Tallinn (Reval).
FRANCE:
Chambre des Députés, Service de l'Information Parlementaire Etrangère, Paris.
Bibliothèque du Sénat, au Palais du Luxembourg, Paris.
GERMANY:
Deutsche Reichstags-Bibliothek, Berlin, N. W. 7.
Anhalt: Anhaltische Landesbücherei, Dessau.
Baden: Universitäts-Bibliothek, Heidelberg.
Braunschweig: Bibliothek des Braunschweigischen Staatsministeriums, Braunschweig.
Mecklenburg-Schwerin: Staatsministerium, Schwerin.
Mecklenburg-Strelitz: Finanzdepartement des Staatsministeriums, Neustrelitz.
Oldenburg: Oldenburgisches Staatsministerium, Oldenburg i. O.
Prussia: Bibliothek des Abgeordnetenhauses, Prinz-Albrechtstrasse 5, Berlin, S. W. 11.
Schaumburg-Lippe: Schaumburg-Lippische Landesregierung, Bücheburg.
GIBRALTAR: Gibraltar Garrison Library Committee, Gibraltar.
GREAT BRITAIN: Library of the Foreign Office, London.
GREECE: Library of Parliament, Athens.
GUATEMALA: Archivo General del Gobierno, Guatemala.
HAITI: Secrétaire d'État des Relations Extérieures, Port-au-Prince.

HONDURAS: Biblioteca del Congreso Nacional, Tegucigalpa.
HUNGARY: Bibliothek des Abgeordnetenhauses, Budapest.
INDIA: Legislative Department, Simla.
ITALY:
Biblioteca del Senato del Regno, Rome.
Biblioteca della Camera dei Deputati, Rome.
IRAQ: Chamber of Deputies, Baghdad, Iraq (Mesopotamia).
IRISH FREE STATE: Dail Eireann, Dublin.
LATVIA: Library of the Saeima, Riga.
LIBERIA: Department of State, Monrovia.
MEXICO: Secretaria de la Cámara de Diputados, Mexico, D. F.
Aguascalientes: Gobernador del Estado de Aguascalientes, Aguascalientes.
Campeche: Gobernador del Estado de Campeche, Campeche.
Chihuahua: Gobernador del Estado de Chihuahua, Chihuahua.
Chiapas: Gobernador del Estado de Chiapas, Tuxtla Gutierrez.
Coahuila: Periódico Oficial del Estado de Coahuila, Palacio de Gobierno, Saltillo.
Colima: Gobernador del Estado de Colima, Colima.
Durango: Gobernador Constitucional del Estado de Durango, Durango.
Guanajuato: Secretaría General de Gobierno del Estado, Guanajuato.
Guerrero: Gobernador del Estado de Guerrero, Chilpancingo.
Jalisco: Biblioteca del Estado, Guadalajara.
Lower California: Gobernador del Distrito Norte, Mexicali, B. C., Mexico.
Mexico: Gaceta del Gobierno, Toluca, Mexico.
Michoacán: Secretaría General de Gobierno del Estado de Michoacán, Morelia.
Morelos: Palacio de Gobierno, Cuernavaca.
Nayarit: Gobernador de Nayarit, Tepic.
Nuevo León: Biblioteca del Estado, Monterey.
Oaxaca: Periódico Oficial, Palacio de Gobierno, Oaxaca.
Puebla: Secretario General de Gobierno, Zaragoza.
Queretaro: Secretaría General de Gobierno, Sección de Archivo, Queretaro.
San Luis Potosi: Congreso del Estado, San Luis Potosi.
Sinaloa: Gobernador del Estado de Sinaloa, Culiacan.
Sonora: Gobernador del Estado de Sonora, Hermosillo.
Tabasco: Secretaría General de Gobierno, Sección 3a, Ramo de Prensa, Villahermosa.
Tamaulipas: Secretaría General de Gobierno, Victoria.
Tlaxcala: Secretaría de Gobierno del Estado, Tlaxcala.
VERA CRUZ: Gobernador del Estado de Vera Cruz, Departamento de Gobernación y Justicia, Jalapa.
Yucatán: Gobernador del Estado de Yucatán, Mérida, Yucatán.
NEW ZEALAND: General Assembly Library, Wellington.
NORWAY: Storthingets Bibliothek, Oslo.
PERU: Cámara de Diputados, Congreso Nacional, Lima.
POLAND: Ministère des Affaires Étrangères, Warsaw.
PORTUGAL: Biblioteca do Congresso da Republica, Lisbon.
RUMANIA:
Bibliothèque de la Chambre des Députés, Bucharest.
Ministère des Affaires Étrangères, Bucharest.
SPAIN:
Biblioteca de la Asamblea Nacional, Madrid.
Barcelona: Biblioteca de la Comisión Permanente Provincial de Barcelona, Barcelona.

SWITZERLAND:
Bibliothèque de l'Assemblée Fédérale Suisse, Berne.
Library of the League of Nations, Geneva.
SYRIA:
Ministère des Finances de la République Libanaise, Service du Matériel, Beirut.
Governor of the State af Alaouites, Lattaquié.
TURKEY: Turkish Grand National Assembly, Angora.
UNION OF SOUTH AFRICA:
Library of Parliament, Cape Town, Cape of Good Hope.
State Library, Pretoria, Transvaal.
URUGUAY: Biblioteca de la Cámara de Representantes, Montevideo.
VENEZUELA: Cámara de Diputados, Congreso Nacional, Carácas.
YUGOSLAVIA: Library of the Skupshtina, Belgrade.

FOREIGN EXCHANGE AGENCIES

South Australia has changed its exchange bureau from the Public Library at Adelaide to the Government Printing and Stationery Office, the name of the new bureau being the South Australian Government Exchanges Bureau.

The Austrian exchange agency, formerly the Bundesamt für Statistik, is now Internationale Austauschstelle, Bundeskanzleramt, Herrengasse 23, Vienna I.

The Nationalist Government of China has transferred its Bureau of International Exchange from Peking to Shanghai and made the bureau a part of the National Research Institute.

A list of the foreign exchange bureaus or agencies is given below. Most of those agencies forward consignments to the Smithsonian Institution for distribution in the United States.

LIST OF EXCHANGE AGENCIES

ALGERIA, via France.
ANGOLA, via Portugal.
ARGENTINA: Comisión Protectora de Bibliotecas Populares, Calle Córdoba 931, Buenos Aires.
AUSTRIA: Internationale Austauschstelle, Bundeskanzleramt, Herrengasse 23, Vienna I.
AZORES, via Portugal.
BELGIUM: Service Belge des Échanges Internationaux, Rue des Longs-Chariots, 46, Brussels.
BOLIVIA: Oficina Nacional de Estadistica, La Paz.
BRAZIL: Servicio de Permutações Internacionaes, Bibliotheca Nacional, Rio de Janeiro.
BRITISH COLONIES: Crown Agents for the Colonies, London.
BRITISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.
BRITISH HONDURAS: Colonial Secretary, Belize.
BULGARIA: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.
CANARY ISLANDS, via Spain.
CHILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

CHINA: Bureau of International Exchange, National Research Institute, 205 Avenue du Roi Albert, Shanghai.
COLOMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.
COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
CZECHOSLOVAKIA: Service Tchécoslovaque des Echanges Internationaux, Bibliothèque de l'Assemblée Nationale, Prague 1–79.
DANZIG: Amt für den Internationalen Schriftenaustausch der Freien Stadt Danzig, Stadtbibliothek, Danzig.
DENMARK: Kongelige Danske Videnskabernes Selskab, Copenhagen.
DUTCH GUIANA: Surinaamsche Koloniale Bibliotheek, Paramaribo.
ECUADOR: Ministerio de Relaciones Exteriores, Quito.
EGYPT: Bureau des Publications, Ministère des Finances, Cairo.
ESTONIA: Riigiraamatukogu (State Library), Tallinn (Reval).
FINLAND: Delegation of the Scientific Societies of Finland, Helsingfors.
FRANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.
GERMANY: Amerika-Institut, Universitätstrasse 8, Berlin, N. W. 7.
GREAT BRITAIN AND IRELAND: Messrs. Wheldon & Wesley, 2, 3, and 4 Arthur St., New Oxford St., London W. C. 2.
GREECE: Bibliothèque Nationale, Athens.
GREENLAND, via Denmark.
GUATEMALA: Instituto Nacional de Varones, Guatemala.
HAITI: Secrétaire d'État des Relations Extérieures, Port-au-Prince.
HONDURAS: Biblioteca Nacional, Tegucigalpa.
HUNGARY: Hungarian Libraries Board, Budapest, IV.
ICELAND, via Denmark.
INDIA: Superintendent of Stationery, Bombay.
ITALY: R. Ufficio degli Scambi Internazionali, Ministero della Pubblica Istruzione, Rome.
JAMAICA: Institute of Jamaica, Kingston.
JAPAN: Imperial Library of Japan, Tokyo.
JAVA, via Netherlands.
KOREA: Government General, Seoul.
LATVIA: Service des Échanges Internationaux, Bibliothèque d'État de Lettonie, Riga.
LIBERIA: Bureau of Exchanges, Department of State, Monrovia.
LITHUANIA: Sent by mail.
LOURENÇO MARQUEZ, via Portugal.
LUXEMBURG, via Belgium.
MADAGASCAR, via France.
MADEIRA, via Portugal.
MOZAMBIQUE, via Portugal.
NETHERLANDS: International Exchange Bureau of the Netherlands, Royal Library, The Hague.
NEW SOUTH WALES: Public Library of New South Wales, Sydney.
NEW ZEALAND: Dominion Museum, Wellington.
NICARAGUA: Ministerio de Relaciones Exteriores, Managua.
NORWAY: Universitets-Bibliotek, Oslo.
PALESTINE: Hebrew University Library, Jerusalem.
PANAMA: Sent by mail.
PARAGUAY: Sección Canje Internacional de Publicaciones del Ministerio de Relaciones Exteriores, Estrella 563, Asuncion.

PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
POLAND: Service Polonais des Échanges Internationaux, Bibliothèque du Ministère des Affaires Étrangères, Warsaw.
PORTUGAL: Secção de Trocas Internacionaes, Biblioteca Nacional, Lisbon.
QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Department, Brisbane.
RUMANIA: Bureau des Échanges Internationaux, Institut Météorologique Central, Bucharest.
RUSSIA: Academy of Sciences, Leningrad.
SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
SIAM: Department of Foreign Affairs, Bangkok.
SOUTH AUSTRALIA: South Australian Government Exchanges Bureau, Government Printing and Stationery Office, Adelaide.
SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
SUMATRA, via Netherlands.
SWEDEN: Kongliga Svenska Vetenskaps Akademien, Stockholm.
SWITZERLAND: Service Suisse des Échanges Internationaux, Bibliothèque Centrale Fédérale, Berne.
SYRIA: American University of Beirut.
TASMANIA: Secretary to the Premier, Hobart.
TRINIDAD: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.
TUNIS, via France.
TURKEY: Robert College, Constantinople.
UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
YUGOSLAVIA: Ministère des Affaires Étrangères, Belgrade.

Respectfully submitted.

C. W. SHOEMAKER,
Chief Clerk, International Exchange Service.

Dr. CHARLES G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 6

REPORT ON THE NATIONAL ZOOLOGICAL PARK

SIR: I have the honor to submit the following report on the operations of the National Zoological Park for the fiscal year ending June 30, 1929:

The appropriation made by Congress for the regular maintenance of the park was $182,050, and there was the usual allotment of $300 for printing and binding and an additional appropriation of $13,500 to cover the increase in salaries of the personnel under the Welch Act.

ACCESSIONS

Gifts.—The park this year has been the recipient of an unusual number of gifts of valuable animals. Notable among these are the several shipments of birds and animals obtained through Dr. H. C. Kellers, United States Navy, who was on duty with the Marines in Nicaragua. The animals were brought to Washington on a transport through the courtesy of the Navy Department. The specimens included large groups of spider monkeys, capuchins, and coatimundis; a flock of 6 sulphur-breasted toucans; a pair of curassows, many parrots, and several unusual birds and small mammals.

Dr. D. W. May sent from Porto Rico two rhinoceros iguanas, an unusual species in captivity. One specimen is doing well and promises to survive. Through Mr. Henry W. O'Malley, United States Commissioner of Fisheries, the park received a trio of northern fur seals from the Pribilof Islands, a species very rare in collections. From the New Zealand Government were received a pair of black swans and a pair of the rare paradise ducks. The New York Zoological Society sent a Prince Rudolph's blue bird of paradise and a Lawes's 6-plumed bird of paradise, part of the collection obtained by Mr. Crandall on the society's New Guinea expedition. Mrs. Emily C. Chadbourne presented a great black cockatoo; Harvey Firestone, jr., a potto from Liberia; Mr. J. F. Goldsby four Canada geese; and Mr. Richard Gordon six blue geese.

The most spectacular addition to the zoo in many years has been N'Gi, the gorilla. The animal was purchased with money remaining from the Smithsonian-Chrysler expedition funds. He weighed 40 pounds on arrival and has been the greatest attraction the zoo has

ever had. There were 40,000 visitors the first Sunday he was here, despite the coldness of the weather, and the following Sunday there were 20,000 more. Up to the present time he has been doing well and the officials of the park hope to keep him for a long time.

The officers of the United States Coast Guard patrol boat *Marion*, while engaged in survey work in Davis Straits, captured and brought to the zoo "Marian," a fine polar-bear cub. This is an especially valuable addition, because the other polar bears are now very aged.

A pair of Sitka deer presented by Mrs. Guy C. Chapin, Karheen, Alaska, through Mr. H. W. Terhune, of the Alaska Game Commission, are the first representatives of their species in the collection for many years.

The park is indebted to the office of the Chief Coordinator, which on numerous occasions has handled imports of animals and greatly facilitated the work of the park in getting them.

DONORS

Mrs. Anne Archbold, Washington, D. C., kinkajou.
Mr. Harry Bachrach, Washington, D. C., raccoon.
Mrs. Lena Bergland, Washington, D. C., grizzly coated cebus.
Mr. J. S. C. Boswell, Alexandria, Va., 7 snakes.
Mr. H. C. Breeden, Florida, raccoon.
Dr. Ira E. Briggs, Washington, D. C., alligator.
Mr. James F. Burgess, Washington, D. C., opossum.
Mr. Andrew J. Campbell, Washington, D. C., white-nosed guenon.
Mrs. E. C. Chadbourne, Washington, D. C., great black cockatoo.
Mrs. Guy C. Chapin, Karheen, Alaska, 2 Sitka deer.
Mr. Walter P. Chrysler, New York City, gorilla.
Mr. F. C. Craighead, Washington, D. C., 3 barred owls.
Mrs. N. M. Crowell, Washington, D. C., blue-headed parrot.
Dr. W. T. Dey, United States Navy, two chachalacas.
Mrs. W. J. Donovan, Washington, D. C., Texas armadillo.
Mr. A. A. Doolittle, Washington, D. C., king snake.
Mr. C. S. Fesser, Chevy Chase, Md., opossum.
Mr. Harvey S. Firestone, jr., Akron, Ohio, Bosman's potto.
Mr. J. F. Goldsby, Polson, Mont., 4 Canada geese.
Mrs. T. M. Goodwin, Scottsville, Va., white-throated capuchin.
Mr. Richard Gordon, Abbeville, La., 6 blue geese.
Mr. E. Hanson, Washington, D. C., coatimundi.
Mr. T. E. Henry, Port-au-Prince, Haiti, 4 scaled pigeons.
Mr. C. A. Higgins, Washington, D. C., green parrakeet.
President Hoover, White House, alligator.
Horne's Zoological Arena Co., Kansas City, Mo., lion.
Mr. J. B. Jones, Smithfield, Va., bald eagle.
Mr. Ellis Joseph, New York City, Humboldt's woolly monkey.
Mr. C. H. Keller, Washington, D. C., opossum.
Mr. William Kemble, Boston, Mass., white-faced capuchin.
Mr. Samuel Kress, Port Limon, Costa Rica, 3-toed sloth.
Mr. E. H. Lewis, Catalina Island, Calif., 6 valley quail, 4 mountain quail.

Mrs. Mary Lincoln, Washington, D. C., canary.
Mr. M. C. Marseglia, Washington, D. C., canary.
Mr. D. W. May, Mayaguez, Porto Rico, 2 rhinoceros iguanas.
Mrs. McFarland, Hellier, Ky., golden eagle.
Mr. E. B. McLean, Washington, D. C., coatimundi.
Mrs. E. B. McLean, Washington, D. C., sooty mangabey.
Mrs. Elinor Messler, Miami, Fla., coatimundi.
Mrs. Mitchell, Washington, D. C., sooty mangabey.
Mr. M. C. Musgrave, Phoenix, Ariz., Gila monster,
New York Zoological Society, New York City, Prince Rudolph's blue bird of paradise, Lawes's 6-plumed bird of paradise.
New Zealand Government, 2 black swans, 1 pair paradise ducks, through J. Langridge.
Mrs. E. E. Patterson, Melbourne, Fla., diamond rattlesnake.
Mr. Harry A. Peters, Ballston, Va., Philippine macaque.
Policemen of seventh precinct, Washington, D. C., 9-banded armadillo.
Mr. Freeman Pollack, Washington, D. C., hog-nosed snake.
Mrs. W. L. Sherman, Washington, D. C., gray coatimundi.
Mr. J. W. Stohlman, Washington, D. C., great horned owl.
Mrs. C. F. Spradling, Athens, Tenn., banded rattlesnake, coot.
Mr. C. G. Taylor, Parksville, N. Y., Canada porcupine.
Mr. Frank Temple, Hyattsville, Md., 2 red-tailed hawks.
United States Bureau of Fisheries, through Mr. Henry O'Malley, 7 Pribilof Island finches, 3 northern fur seals.
United States Coast Guard, New London, Conn., polar bear.
United States Marine Corps, through Dr. H. C. Kellers, United States Navy, 3 margays, 2 kinkajous, 10 gray coatimundis, collared peccary, 3 speckled agoutis, 14 gray spider monkeys, 6 white-throated capuchins, caracara, 10 red-faced paroquets, 2 small green paroquets, 6 sulphur-breasted toucans, 2 curassows, 2 crab-eating raccoons, 45 tovi paroquets, gallinule, red-eared paroquet, 13 yellow-naped parrots, 4 opossums, tree opossum, 3 Petz' paroquets, troupial.
Mr. L. W. Walker, Hugo, Colo., 2 coyotes, 2 white-necked ravens, 2 burrowing owls.
Mrs. Mildred F. Williams, Washington, D. C., West Indian troupial.
Bobby Woods, Washington, D. C., black snake.
Mr. W. B. Wynkoop, Washington, D. C., Philippine monkey.

Births.—There were 58 mammals born and 41 birds hatched in the park during the year. These included the following:

Japanese macaque	1	Alpine ibex	1
Lion	4	Tahr	3
Leopard	3	American elk	1
Neumann's genet	2	Red deer	2
Raccoon	7	Mule deer	1
Llama	3	Barasingha	1
Wild boar	4	Japanese deer	4
Wart hog	4	Fallow deer	4
American bison	2	Trinidad agouti	2
Indian buffalo	1	Paca	1
Yak	1	Canada goose	4
Rocky Mountain sheep	3	White-cheeked goose	7
Mouflon	2	Night heron	12
Aoudad	1	Silver gull	18

The pair of lions presented to President Coolidge by the mayor and citizens of Johannesburg produced four cubs. The parents are still young and promise to become magnificent animals.

Each of the two pairs of leopards caught as adults by the Smithsonian-Chrysler expedition have bred both this year and last. The wart hogs last year gave birth to five young, which died, but this year four young were born and are thriving.

Purchase and exchange.—Among the more important specimens acquired by purchase and exchange have been a cheetah, to replace a pair lost last year; a pair of European wild boars, which have since bred; a lot of 14 lories; a pair of Orinoco geese; four species of tree ducks for the great flight cage in the bird house; a pair of Spix macaws; and two Kea parrots. As the available quarters are limited and crowded, there have been purchased only especially desirable species.

Removals.—Losses by death included one gibbon, which died of pneumonia; a rhinoceros hornbill; a striped hyena, which lived in the park from May 1, 1918, to September 27, 1928; a Malay tapir, which was received September 13, 1921, and died September 29, 1928; a red kangaroo, received in June, 1912, and died November 3, 1928.

Post-mortem examinations were made in most cases by the pathological division of the Bureau of Animal Industry. The following list shows the results of the autopsies:

CAUSES OF DEATH

MAMMALS

Marsupialia: Enteritis, 1; gastroenteritis, 1.

Carnivora: Pneumonia, 3; congestion of lungs, 1; enteritis, 4; gastroenteritis, 3; internal hemorrhage, 1; goiter, 1; accident, 1; no cause found, 1.

Pinnipedia: Gastritis, 1.

Primates: Pneumonia, 3; tuberculosis, 1; gastroenteritis, 1; hepatitis, 2; intestinal parasites, 1.

Artiodactyla: Pneumonia, 1; intestinal obstruction, 1; difficult parturition, 2; old age, 2; no cause found, 1.

Perissodactyla: Accident, 1.

Edentata: No cause found, 1.

BIRDS

Casuariiformes: Aspergillosis, 1.

Ciconiiformes: Tuberculosis, 1; congestion of lungs, 1; enteritis, 1.

Anseriformes: Congestion of lungs, 1.

Psittaciformes: Enteritis, 1; no cause found, 1.

Coraciiformes: Gastroenteritis, 1.

Passeriformes: Aspergillosis, 1.

ANIMALS IN THE COLLECTION JUNE 30, 1929

MAMMALS

MARSUPIALIA

Virginia opossum (*Didelphis virginiana*)	8	Great red kangaroo (*Macropus rufus*)	1
Flying phalanger (*Petaurus breviceps*)	2	Wombat (*Phascolomys mitchelli*)	1
Brush-tailed rock wallaby (*Petrogale penicillata*)	1		

CARNIVORA

Kadiak bear (*Ursus middendorffi*)	2
Alaska Peninsula bear (*Ursus gyas*)	4
Kidder's bear (*Ursus kidderi*)	2
European bear (*Ursus arctos*)	8
Grizzly bear (*Ursus horribilis*)	1
Apache grizzly (*Ursus apache*)	1
Himalayan bear (*Selenarctos thibetanus*)	1
Black bear (*Euarctos americanus*)	4
Cinnamon bear (*Euarctos americanus cinnamomum*)	4
Glacier bear (*Euarctos emmonsii*)	1
Sun bear (*Helarctos malayanus*)	1
Polar bear (*Thalarctos maritimus*)	3
Dingo (*Canis dingo*)	2
Gray wolf (*Canis nubilus*)	7
Coyote (*Canis latrans*)	7
Albino coyote (*Canis latrans*)	1
California coyote (*Canis ochropus*)	1
Hybrid coyote (*Canis latrans-rufus*)	4
Black-backed jackal (*Thos mesomelas*)	1
Red fox (*Vulpes fulva*)	8
Silver-black fox (*Vulpes fulva*)	1
European fox (*Vulpes vulpes*)	1
Kit fox (*Vulpes velox*)	1
Gray fox (*Urocyon cinereoargenteus*)	3
Cacomistle (*Bassariscus astutus*)	2
Raccoon (*Procyon lotor*)	15
Florida raccoon (*Procyon lotor elucus*))	2
Gray coatimundi (*Nasua narica*)	9
Kinkajou (*Potos flavus*)	5
Mexican kinkajou (*Potos flavus aztecus*)	1
Tayra (*Tayra barbara*)	1
Skunk (*Mephitis nigra*)	3
Wolverine (*Gulo luscus*)	3
American badger (*Taxidea americana*)	2
Ratel (*Mellivora capensis*)	1
Florida otter (*Lutra canadensis vaga*)	1
Palm civet (*Paradoxurus hermaphroditus*)	1
Binturong (*Arctictis binturong*)	1
Egyptian mongoose (*Herpestes ichneumon*)	1
Aard-wolf (*Proteles cristaius*)	1
East African spotted hyena (*Crocuta crocuta germinans*)	1
Brown hyena (*Hyæna brunnea*)	2
African cheetah (*Acinonyx jubatus*)	1
Lion (*Felis leo*)	10
Bengal tiger (*Felis tigris*)	1
Manchurian tiger (*Felis tigris longipilis*)	3
Black leopard (*Felis pardus*)	1
East African leopard (*Felis pardus suahelicus*)	9
Serval (*Felis serval*)	1
East African serval (*Felis capensis hindei*)	2
Ocelot (*Felis pardalis*)	2
Brazilian ocelot (*Felis pardalis brasiliensis*)	1
Mexican puma (*Felis azteca*)	3
Indian caracal (*Lynx caracal*)	1
Abyssinian caracal (*Lynx caracal nubica*)	1
Bay lynx (*Lynx rufus*)	3
Bailey's lynx (*Lynx baileyi*)	1
Clouded leopard (*Neofelis nebulosa*)	1

PINNIPEDIA

California sea-lion (*Zalophus californianus*)	3
Northern fur seal (*Callotaria alascana*)	2
Leopard seal (*Phoca richardii var.*)	2
Harbor seal (*Phoca vitulina*)	1

RODENTIA

Woodchuck (*Marmota monax*)	5
Prairie dog (*Cynomys ludovicianus*)	11
Albino squirrel (*Sciurus carolinensis*)	2
American beaver (*Castor canadensis*)	2
East African porcupine (*Hystrix galeata*)	2
South African porcupine (*Hystrix africæ-australis*)	1
Malay porcupine (*Acanthion brachyurum*)	2
Central American paca (*Cuniculus paca virgatus*)	3
Trinidad agouti (*Dasyprocta rubrata*)	6
Speckled agouti (*Dasyprocta punctata*)	2
Guinea pig (*Cavia porcellus*)	10
Capybara (*Hydrochœrus hydrochæris*)	1

LAGOMORPHA

Domestic rabbit (*Oryctolagus cuniculus*)	10

PRIMATES

Zanzibar lemur (*Galago garnetti*)	1
Red-fronted lemur (*Lemur rufifrons*)	1
Black lemur (*Lemur macaco*)	1
Douroucouli (*Aotus trivirgatus*)	1
Gray spider monkey (*Ateles geoffroyi*)	4
Humboldt's woolly monkey (*Lagothrix humboldti*)	1
White-throated capuchin (*Cebus capucinus*)	8
Weeping capuchin (*Cebus apella*)	2
Chacma (*Papio porcarius*)	2
Anubis baboon (*Papio cynocephalus*)	6
Hamadryas baboon (*Papio hamadryas*)	1
Mandrill (*Papio sphinx*)	3
Drill (*Papio leucophæus*)	1
Moor monkey (*Cynopithecus maurus*)	3
Black ape (*Cynopithecus niger*)	1
Barbary ape (*Simia sylvanus*)	2
Japanese macaque (*Macaca fuscata*)	4
Brown macaque (*Macaca arctoides*)	2
Pig-tailed monkey (*Macaca nemestrina*)	1
Burmese macaque (*Macaca andamenensis*)	1
Rhesus monkey (*Macaca rhesus*)	12
Philippine macaque (*Macaca syrichta*)	3
Javan macaque (*Macaca mordax*)	5
Sooty mangabey (*Cercocebus fuliginosus*)	5
Green guenon (*Lasiopyga callitrichus*)	2
Vervet (*Lasiopyga pygerythra*)	1
Johnston's vervet (*Lasiopyga pygerythra johnstoni*)	2
Mozambique monkey (*Lasiopyga sp.*)	2
Sykes' guenon (*Lasiopyga albigularis*)	5
Mona guenon (*Lasiopyga mona*)	2
De Brazza's guenon (*Lasiopyga brazzæ*)	1
Lesser white-nosed guenon (*Lasiopyga petaurista*)	2
Gray gibbon (*Hylobates leuciscus*)	1
Chimpanzee (*Pan satyrus*)	2
Orang-utan (*Pongo pygmæus*)	1
Gorilla (*Gorilla gorilla*)	1

ARTIODACTYLA

Wild boar (*Sus scrofa*)	4
Wart hog (*Phacochœrus æthiopicus*)	7
River hog (*Potamochœrus africanus*)	1
Collared peccary (*Pecari angulatus*)	3
Hippopotamus (*Hippopotamus amphibius*)	2
Pigmy hippopotamus (*Chœropsis liberiensis*)	1
Bactrian camel (*Camelus bactrianus*)	1
Arabian camel (*Camelus dromedarius*)	1
Guanaco (*Lama huanachus*)	2
Llama (*Lama glama*)	7
Reindeer (*Rangifer tarandus*)	4
Fallow deer (*Dama dama*)	14
White fallow deer (*Dama dama*)	1
Axis deer (*Axis axis*)	1
Hog deer (*Hyelaphus porcinus*)	5
Barasingha (*Rucervus duvaucelii*)	6
Burmese deer (*Rucervus eldii*)	1
Japanese deer (*Sika nippon*)	10
Red deer (*Cervus elaphus*)	13
Kashmir deer (*Cervus hanglu*)	2
Bedford deer (*Cervus xanthopygus*)	5
American elk (*Cervus canadensis*)	5
Costa Rican deer (*Odocoileus sp.*)	2
Guatemala deer (*Odocoileus sp.*)	1
Mule deer (*Odocoileus hemionus*)	1
Sitka deer (*Odocoileus columbianus sitkensis*)	2
Brindled gnu (*Connochætes taurinus*)	1
White-bearded gnu (*Connochætes taurinus albojubatus*)	2
Lechwe (*Onotragus leche*)	1
Inyala (*Tragelaphus angasi*)	1
Greater kudu (*Strepsiceros strepsiceros*)	1
Reed buck (*Redunca bohor*)	1
East African impalla (*Æpyceros melampus suara*)	2
Indian antelope (*Antilope cervicapra*)	1
Nilgai (*Boselaphus tragocamelus*)	2
Mountain goat (*Oreamnos americanus*)	2
Tahr (*Hemitragus jemlahicus*)	8
Alpine ibex (*Capra ibex*)	2
Aoudad (*Ammotragus lervia*)	4
Rocky Mountain sheep (*Ovis canadensis*)	12
Mouflon (*Ovis europæus*)	6
Greenland musk-ox (*Ovibos moschatus wardi*)	1
Zebu (*Bos indicus*)	1
Yak (*Poëphagus grunniens*)	7
American bison (*Bison bison*)	15
Anoa (*Anoa depressicornis*)	1
Indian buffalo (*Bubalus bubalis*)	3
South African buffalo (*Synceros caffer*)	1

PERISSODACTYLA

Brazilian tapir (*Tapirus terrestris*)	1
Baird's tapir (*Tapirella bairdii*)	1
Mongolian horse (*Equus przewalskii*)	2
Mountain zebra (*Equus zebra*)	2
Chapman's zebra (*Equus quagga chapmani*)	2
Zebra-horse hybrid (*Equus grevyi-caballus*)	1
Zebra-ass hybrid (*Equus grevyi-asinus*)	1

PROBOSCIDEA

Abyssinian elephant (*Loxodonta africana oxyotis*)	1
Sumatran elephant (*Elephas sumatranus*)	1

XENARTHRA

Armadillo (*Dasypus novemcinctus*)	1

BIRDS

STRUTHIONIFORMES

South African ostrich (*Struthio australis*)	3
Somaliland ostrich (*Struthio molybdophanes*)	1
Nubian ostrich (*Struthio camelus*)	1

RHEIFORMES

Rhea (*Rhea americana*)	1

CASUARIIFORMES

Single-wattled cassowary (*Casuarius uniappendiculatus*)	1
Sclater's cassowary (*Casuarius philipi*)	1
Cassowary (*Casuarius sp.*)	1
Emu (*Dromiceius novæhollandiæ*)	2

CICONIIFORMES

American white pelican (*Pelecanus erythrorhynchos*)	9
European white pelican (*Pelecanus onocrotalus*)	2
Roseate pelican (*Pelecanus roseus*)	1
Australian pelican (*Pelecanus conspicillatus*)	2
Brown pelican (*Pelecanus occidentalis*)	5
California brown pelican (*Pelecanus californicus*)	5
Florida cormorant (*Phalacrocorax auritus floridanus*)	2
Brandt's cormorant (*Phalacrocorax penicillatus*)	1
Snake bird (*Anhinga anhinga*)	3
Great white heron (*Ardea occidentalis*)	1
Great blue heron (*Ardea herodias*)	2
Hybrid great blue and white heron (*Ardea herodias-occidentalis*)	1
Goliath heron (*Ardea goliath*)	1
Black-crowned night heron (*Nycticorax nycticorax nævius*)	91
Boatbill (*Cochlearius cochlearius*)	3
White-necked stork (*Dissura episcopus*)	1
Indian adjutant (*Leptoptilus dubius*)	2
Shoe-bill (*Balæniceps rex*)	1
Wood ibis (*Mycteria americana*)	1
Sacred ibis (*Threskiornis æthiopicus*)	1
Black-headed ibis (*Threskiornis melanocephalus*)	3
White ibis (*Guara alba*)	7
Scarlet ibis (*Guara rubra*)	3
European flamingo (*Phœnicopterus roseus*)	1

ANSERIFORMES

Mallard (*Anas platyrhynchos*)	26
Black duck (*Anas rubripes*)	7
Australian black duck (*Anas superciliosa*)	1
Gadwall (*Chaulelasmus streperus*)	12
European widgeon (*Mareca penelope*)	3
Baldpate (*Mareca americana*)	9
Green-winged teal (*Nettion carolinense*)	3
European teal (*Nettion crecca*)	4
Baikal teal (*Nettion formosum*)	5
Blue-winged teal (*Querquedula discors*)	1
Garganey (*Querquedula querquedula*)	6
Paradise duck (*Casarca variegata*)	2
Shoveller (*Spatula clypeata*)	1
Pintail (*Dafila acuta*)	11
Bahama pintail (*Dafila bahamensis*)	3
African pintail (*Dafila erythrorhyncha*)	2
Wood duck (*Aix sponsa*)	7
Mandarin duck (*Dendronessa galericulata*)	7

Canvasback (*Marila valisineria*)	7
European pochard (*Marila ferina*)	3
Redhead (*Marila americana*)	11
Tufted duck (*Marila fuligula*)	1
Lesser scaup duck (*Marila affinis*)	1
Greater scaup duck (*Marila marila*)	3
Rosy-billed pochard (*Metopiana peposaca*)	4
Egyptian goose (*Chenalopex aegyptiacus*)	2
Hawaiian goose (*Nesochen sandvicensis*)	2
Blue goose (*Chen cærulescens*)	11
White-fronted goose (*Anser albifrons*)	3
American white-fronted goose (*Anser albifrons gambeli*)	1
Bean goose (*Anser fabalis*)	2
Pink-footed goose (*Anser brachyrhynchus*)	1
Chinese goose (*Cygnopsis cygnoides*)	3
Orinoco goose (*Chenalopex jubata*)	1
Bar-headed goose (*Eulabeia indica*)	2
Canada goose (*Branta canadensis*)	17
Hutchins's goose (*Branta canadensis hutchinsii*)	3
White-cheeked goose (*Branta canadensis occidentalis*)	22
Cackling goose (*Branta canadensis minima*)	2
Brant (*Branta bernicla glaucogastra*)	9
Barnacle goose (*Branta leucopsis*)	3
Emperor goose (*Philacte canagica*)	1
Spur-winged goose (*Plectropterus gambensis*)	5
Muscovy duck (*Cairina moschata*)	3
Black-bellied tree duck (*Dendrocygna autumnalis*)	1
Fulvous tree duck (*Dendrocygna fulva*)	1
White-faced tree duck (*Dendrocygna viduata*)	1
Gray-breasted tree duck (*Dendrocygna discolor*)	2
West Indian tree duck (*Dendrocygna arborea*)	2
Eyton's tree duck (*Dendrocygna eytoni*)	3
Mute swan (*Cygnus gibbus*)	1
Whistling swan (*Cygnus columbianus*)	1
Black swan (*Chenopis atrata*)	8

FALCONIFORMES

Condor (*Vultur gryphus*)	1
California condor (*Gymnogyps californianus*)	3
Turkey vulture (*Cathartes aura*)	6
Black vulture (*Coragyps urubu*)	1
King vulture (*Sarcoramphus papa*)	2
Secretary bird (*Sagittarius serpentarius*)	1
Griffon vulture (*Gyps fulvus*)	1
Ruppell's vulture (*Gyps rueppelli*)	2
Northern eared vulture	2
African black vulture (*Torgos tracheliotus*)	1
Cinereous vulture (*Ægypius monachus*)	2
White-headed vulture (*Trigonoceps occipitalis*)	1
Caracara (*Polyborus cheriway*)	4
Wedge-tailed eagle (*Uroaëtus audax*)	2
Golden eagle (*Aquila chrysaëtos*)	7
Tawny eagle (*Aquila rapax*)	1
Bald eagle (*Haliæetus leucocephalus leucocephalus*)	10
Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)	2
Red-tailed hawk (*Buteo borealis*)	10
Broad-winged hawk (*Buteo platypterus*)	1
East African chanting goshawk (*Melierax polioopterus*)	1
Sparrow hawk (*Falco sparverius*)	3
Osprey (*Pandion haliaëtus carolinensis*)	1

GALLIFORMES

Panama curassow (*Crax panamensis*)	2
Mexican curassow (*Crax globicera*)	2
Spix's wattled curassow (*Crax globulosa*)	3
Razor-billed curassow (*Mitu mitu*)	1
Crested guan (*Penelope boliviana*)	1
Chestnut-winged guan (*Ortalis garrula*)	1
Chachalaca (*Ortalis vetula*)	3
Vulturine guinea fowl (*Acryllium vulturinum*)	2
Reichenow's helmeted guinea fowl (*Numida mitrata reichenowi*)	10
Peafowl (*Pavo cristatus*)	7
Albino peafowl (*Pavo cristatus*)	4
Javan jungle fowl (*Gallus varius*)	3
Argus pheasant (*Argus giganteus*)	2
Silver pheasant (*Gennæus nycthemerus*)	2
Edward's pheasant (*Gennæus edwardsi*)	1
Golden pheasant (*Chrysolophus pictus*)	5
Lady Amherst's pheasant (*Chrysolophus amherstiæ*)	1
Ring-necked pheasant (*Phasianus torquatus*)	11
Migratory quail (*Coturnix coturnix*)	8
Pigmy quail (*Excalfactoria chinensis*)	4
Valley quail (*Lophortyx californica vallicola*)	3
Scaled quail (*Callipepla squamata*)	4
Crowned wood partridge (*Rollulus cristatus*)	1

GRUIFORMES

Florida gallinule (*Gallinula chloropus galeata*)	1
Purple gallinule (*Ionornis martinicus*)	1
East Indian gallinule (*Porphyrio calvus*)	1
Pukeko (*Porphyrio stanleyi*)	1
Black-tailed moor hen (*Microtribonyx ventralis*)	1
American coot (*Fulica americana*)	2
African moor hen (*Fulica cristata*)	4
African black crake (*Limnocrax flavirostra*)	1
Lesser rail (*Hypotænidia philippensis*)	2
South Island weka rail (*Ocydromus australis*)	1
Sandhill crane (*Megalornis mexicana*)	4
Little brown crane (*Megalornis canadensis*)	3
White-necked crane (*Megalornis leucauchen*)	1
Indian white crane (*Megalornis leucogeranus*)	1
Lilford's crane (*Megalornis lilfordi*)	1
Australian crane (*Mathewsena rubicunda*)	2
Demoiselle crane (*Anthropoides virgo*)	3
West African crowned crane (*Balearica pavonina*)	2
East African crowned crane (*Balearica regulorum gibbericeps*)	5
Common trumpeter (*Psophia crepitans*)	2
Green-winged trumpeter (*Psophia viridis*)	3
Kagu (*Rhynochetos jubatus*)	1

CHARADRIIFORMES

Ruff (*Philomachus pugnax*)	3
South American stone plover (*Œdicnemus bistriatus vocifer*)	1
Pacific gull (*Gabianus pacificus*)	1
Great black-backed gull (*Larus marinus*)	2
Western gull (*Larus occidentalis*)	6
Herring gull (*Larus argentatus*)	3
Silver gull (*Larus novæhollandiæ*)	48
Laughing gull (*Larus atricilla*)	2
Victoria crowned pigeon (*Goura victoria*)	1
Nicobar pigeon (*Calœnas nicobarica*)	8
Bronze-wing pigeon (*Phaps chalcoptera*)	1

Bleeding-heart dove (*Gallicolumba luzonica*)	8
Wood pigeon (*Columba palumbus*)	6
Scaled pigeon (*Columba squamosa*)	3
Triangular spotted pigeon (*Columba guinea*)	3
Fiji Island pigeon (*Janthœnas vitiensis*)	1
Mourning dove (*Zenaidura macroura carolinensis*)	1
Mexican dove (*Zenaidura graysoni*)	1
White-fronted dove (*Leptotila fulviventris brachyptera*)	4
Necklace dove (*Spilopelia tigrina*)	1
Emerald-spotted dove (*Turtur chalcospilos*)	21
Ringed turtledove (*Streptopelia risoria*)	5
East African ring-necked dove (*Streptopelia capicola tropica*)	31
Masai mourning dove (*Streptopelia decipiens perspicillata*)	12
Zebra dove (*Geopelia striata*)	3
Bar-shouldered dove (*Geopelia humeralis*)	1
Cape masked dove (*Œna capensis*)	12
Inca dove (*Scardafella inca*)	1
Cuban ground dove (*Chæmepelia passerina aflavida*)	1
Pacific fruit pigeon (*Globicera pacifica*)	1
Bronze fruit pigeon (*Muscadivores ænea*)	1

PSITTACIFORMES

Kea (*Nestor notabilis*)	3
Violet-necked lory (*Eos variegata*)	2
Forsten's lorikeet (*Trichoglossus forsteni*)	3
Great black cockatoo (*Microglossus aterrimus*)	2
Roseate cockatoo (*Kakatoe roseicapilla*)	13
Bare-eyed cockatoo (*Kakatoe gymnopis*)	1
Leadbeater's cockatoo (*Kakatoe leadbeateri*)	2
White cockatoo (*Kakatoe alba*)	1
Sulphur-crested cockatoo (*Kakatoe galerita*)	6
Great red-crested cockatoo (*Kakatoe moluccensis*)	1
Mexican green macaw (*Ara militaris mexicana*)	2
Severe macaw (*Ara severa*)	1
Blue and yellow macaw (*Ara ararauna*)	7
Red and blue and yellow macaw (*Ara macao*)	4
Illiger's macaw (*Ara maracana*)	1
Spix's macaw (*Cyanopsittacus spixi*)	2
Hyacinthine macaw (*Anodorhynchus hyacinthinus*)	1
Blue-winged conure (*Pyrrhura picta*)	2
Nanday paroquet (*Nandayus nenday*)	6
Gray-breasted paroquet (*Myopsitta monachus*)	3
Petz's paroquet (*Eupsittula canicularis*)	7
Golden-crowned paroquet (*Eupsittula aurea*)	1
Weddell's paroquet (*Eupsittula weddellii*)	3
Golden paroquet (*Brotogeris chrysosema*)	1
Tovi paroquet (*Brotogeris jugularis*)	8
Yellow-naped parrot (*Amazona auropalliata*)	8
Mealy parrot (*Amazona farinosa*)	2
Orange-winged parrot (*Amazona amazonica*)	5
Blue-fronted parrot (*Amazona æstiva*)	1
Red-crowned parrot (*Amazona viridigenalis*)	3
Double-yellow-head parrot (*Amazona oratrix*)	4
Yellow-headed parrot (*Amazona ochrocephala*)	7
Panama parrot (*Amazona panamensis*)	1
Festive parrot (*Amazona festiva*)	3
Lesser white-fronted parrot (*Amazona albifrons nana*)	1
Santo Domingo parrot (*Amazona ventralis*)	3
Cuban parrot (*Amazona leucocephala*)	6
Maximilian's parrot (*Pionus maximiliani*)	1
Dusky parrot (*Pionus fuscus*)	1
Blue-headed parrot (*Pionus menstruus*)	1
Amazonian caique (*Pionites xanthomera*)	3
Hawk-head parrot (*Deroptyus accipitrinus*)	1
Yellow-fronted parrot (*Poicephalus flavifrons*)	1
East African brown parrot (*Poicephalus meyeri matschiei*)	2
Congo parrot (*Poicephalus gulielmi*)	1
Greater vasa parrot (*Coracopsis vasa*)	1
Red-faced love-bird (*Agapornis pullaria*)	5
Gray-headed love-bird (*Agapornis madagascariensis*)	8
Yellow-collared love-bird (*Agapornis personata*)	5
Fischer's love-bird (*Agapornis fischeri*)	4
Nyassa love-bird (*Agapornis lilianæ*)	9
Blue-crowned hanging paroquet (*Loriculus galgulus*)	1
Blue-bonnet paroquet (*Psephotus hæmatorrhous*)	1
Pennant's paroquet (*Platycercus elegans*)	1
Rosella paroquet (*Platycercus eximius*)	1
Crimson-winged paroquet (*Aprosmictus erythropterus*)	1
Ring-necked paroquet (*Conurus torquatus*)	1
Nepalese paroquet (*Conurus nepalensis*)	2
Long-tailed paroquet (*Conurus longicauda*)	1
Blossom-head paroquet (*Conurus cyanocephala*)	1
Grass paroquet (*Melopsittacus undulatus*)	10

CUCULIFORMES

Donaldson's turaco (*Turacus donaldsoni*)	1
Long-tailed cuckoo (*Eudynamis honorata*)	1

CORACIIFORMES

Jackson's hornbill (*Lophoceros jacksoni*)	1
Red-beaked hornbill (*Lophoceros erythrorhynchus*)	1
White-browed hornbill (*Anthracoceros malayanus*)	1
Plicated hornbill (*Rhytidoceros plicatus*)	1
Keel-billed toucan (*Ramphastos piscivorus*)	3
Ariel toucan (*Ramphastos ariel*)	1
Emin Pasha's barbet (*Trachyphonus emini*)	1
Barred owl (*Strix varia varia*)	14
Florida barred owl (*Strix varia alleni*)	1
Snowy owl (*Nyctea nyctea*)	1
Screech owl (*Otus asio*)	4
Great horned owl (*Bubo virginianus*)	10
Eagle owl (*Bubo bubo*)	1
American barn owl (*Tyto alba pratincola*)	3
African barn owl (*Tyto alba affinis*)	1

PASSERIFORMES

Red-billed hill-tit (*Liothrix luteus*)	18
Black-gorgeted laughing thrush (*Garrulax pectoralis*)	2
White-cheeked bulbul (*Molpastes leucogenys*)	1
Black-headed bulbul (*Molpastes hæmorrhous*)	3
White-eared bulbul (*Otocompsa leucotis*)	3
Red-eared bulbul (*Otocompsa jocosa*)	4
Piping crow-shrike (*Gymnorhina tibicen*)	1
White-necked raven (*Corvultur albicollis*)	1
American raven (*Corvus corax sinuatus*)	5
Australian crow (*Corvus coronoides*)	1
American crow (*Corvus brachyrhynchos*)	1

White-breasted crow (*Corvus albus*) 2
Red bird of paradise (*Paradisea sanguinea*) 2
Prince Rudolph's blue bird of paradise (*Paradisornis rudolphi*) 1
Lawes' bird of paradise (*Parotia lawesi*) 1
American magpie (*Pica pica hudsonia*) 1
Red-billed blue magpie (*Urocissa occipitalis*) 1
Yucatan jay (*Cissilopha yucatanica*) 2
Blue jay (*Cyanocitta cristata*) 2
Green jay (*Xanthoura luxuosa*) 2
Pileated jay (*Cyanocorax pileatus*) 2
Blue honey-creeper (*Cyanerpes cyaneus*) 1
Blue-winged tanager (*Tanagra cyanoptera*) 1
Blue tanager (*Thraupis cana*) 1
Giant whydah (*Diatropura progne*) 1
Paradise whydah (*Steganura paradisea*) 1
Shaft-tailed whydah (*Tetrænura regia*) 1
Red-crowned bishop bird (*Pyromelana sylvatica*) 4
Red-billed weaver (*Quelea quelea*) 5
Buffalo weaver (*Textor albirostris*) 2
Black-winged coral-billed weaver (*Textor niger nyassæ*) 25
Madagascar weaver (*Foudia madagascariensis*) 4
Black-headed weaver (*Hyphanturgus nigriceps*) 30
Southern masked weaver finch (*Quelea sanguinirostris intermedia*) 12
Emin's scaly-headed finch (*Sporopipes frontalis emini*) 25
St. Helena waxbill (*Estrilda astrilda*) 4
Orange-cheeked waxbill (*Estrilda melpoda*) 1
Rosy-rumped waxbill (*Estrilda rhodopygia*) 1
Blue-headed blue waxbill (*Uræginthus bengalus cyanocephalus*) 2
East African fire-throated finch (*Pytilia kirki*) 10
Strawberry finch (*Amandava amandava*) 20
Nutmeg finch (*Munia punctulata*) 50
White-headed nun (*Munia maja*) 1
Black-headed nun (*Munia atricapilla*) 2
Chestnut-breasted finch (*Munia castaneithorax*) 2
Java finch (*Munia oryzivora*) 27
Masked grass finch (*Poëphila personata*) 5
Diamond finch (*Steganopleura guttata*) 1
Zebra finch (*Tæniopygia castanotis*) 10
Cutthroat finch (*Amadina fasciata*) 14
Tanganyika cutthroat finch (*Amadina fasciata alexanderi*) 12
Red-headed finch (*Amadina erythrocephala*) 2
Yellow-headed marshbird (*Agelaius icterocephalus*) 1
Australian gray jumper (*Struthidea cinerea*) 1
European starling (*Sturnus vulgaris*) 9
Shining starling (*Lamprocorax metallicus*) 2
Southern glossy starling (*Lamprocolius pestis*) 4
Crested starling (*Galeopsar salvadorii*) 1
White-capped starling (*Heteropsar albicapillus*) 1
Indian mynah (*Acridotheres tristis*) 1
Crested mynah (*Æthiopsar cristatellus*) 1
Malay grackle (*Gracula javana*) 1
Bar-jawed troupial (*Gymnomystax melanicterus*) 1
West Indian troupial (*Icterus icterus*) 1
Hooded oriole (*Icterus cucullatus*) 1
Yellow-tailed oriole (*Icterus mesomelas*) 1
Purple grackle (*Quiscalus quiscula*) 1
Greenfinch (*Chloris chloris*) 3
Yellowhammer (*Emb riza citrinella*) 1
House finch (*Carpodacus mexicanus frontalis*) 2
San Lucas house finch (*Carpodacus mexicanus ruberrimus*) 2
Canary (*Serinus canarius*) 6
Little yellow serin (*Serinus icterus*) 15
Gray singing finch (*Serinus leucopygius*) 9
White-throated sparrow (*Zonotrichia albicollis*) 1
San Diego song sparrow (*Melospiza melodia cooperi*) 2
Coastal pale-bellied sparrow (*Passer griseus suahelicus*) 20
Saffron finch (*Sicalis flaveola*) 4
Guiana blue grosbeak (*Cyanocompsa cyanoides*) 1
Chinese grosbeak (*Eophona migratoria sowerbyi*) 1
Red-crested cardinal (*Paroaria*) 3

REPTILES

Alligator (*Alligator mississipiensis*) 26
Broad-nosed corcodile (*Osteolæmus tetraspis*) 6
Horned toad (*Phrynosoma cornutum*) 4
Gila monster (*Heloderma suspectum*) 8
Beaded lizard (*Heloderma horridum*) 2
Scaly-tailed lizard (*Uromastix hardwicki*) 4
Green lizard (*Lacerta viridis*) 2
Egyptian monitor (*Varanus niloticus*) 1
West Indian Iguana (*Cyclura cornuta*) 2
African sand-boa (*Eryx*) 2
Indian sand-boa (*Eryx*) 2
Ball python (*Python regius*) 1
Rock python (*Python molurus*) 2
Regal python (*Python reticulatus*) 1
African python (*Python sebæ*) 9
Anaconda (*Eunectes murinus*) 1
Dog-headed boa (*Corallus caninus*) 2
Black snake (*Coluber constrictor*) 5
Corn snake (*Elaphe guttata*) 1
Chicken snake (*Elaphe 4-lineatus*) 1
Pine snake (*Pituophis melanoleucus*) 2
King snake (*Lampropeltis getulus*) 2
Hog-nosed snake (*Heterodon platyrhinos*) 1
Water snake (*Natrix sipedon*) 1
Black-necked spitting cobra (*Naja nigricollis*) 1
Copperhead (*Agkistrodon mokasen*) 5
Florida rattlesnake (*Crotalus adamanteus*) 2
Western diamond rattlesnake (*Crotalus atrox*) 1
Banded rattlesnake (*Crotalus horridus*) 3
Snapping turtle (*Chelydra serpentina*) 2
Florida snapping turtle (*Chelydra osceola*) 1
African snake-necked terrapin (*Pelomedusa galeata*) 40
Australian snake-necked terrapin (*Chelodina longicollis*) 3
Musk turtle (*Sternotherus odoratus*) 1
Mexican musk turtle (*Kinosternon sonoriense*) 1
South American musk turtle (*Kinosternon scorpioides*) 5
Pennsylvania musk turtle (*Kinosternon subrubrum*) 2
Wood turtle (*Clemmys insculpta*) 2
Leprous terrapin (*Clemmys leprosa*) 1
Blanding's terrapin (*Emys blandingii*) 2
European pond turtle (*Emys orbicularis*) 3
South American terrapin (*Nicoria punctularia*) 1
Reeves turtle (*Geoclemys reevesi*) 1
Loochoo turtle (*Geoemyda spengleri*) 1

Painted turtle (*Chrysemys picta*)	2	Berlandier's tortoise (*Testudo berlandieri*)	1
Western painted turtle (*Chrysemys belli*)	1	Soft-shelled tortoise (*Testudo loveridgei*)	8
Gopher tortoise (*Gopherus polyphemus*)	1	Chicken turtle (*Deirochelys reticularia*)	1
Duncan Island tortoise (*Testudo ephippium*)	3	BATRACHIANS	
Indefatigable Island tortoise (*Testudo porteri*)	1		
Albermarle Island tortoise (*Testudo vicina*)	2	African smooth-clawed frog (*Xenopus mulleri*)	28
Angulated tortoise (*Testudo angulata*)	1	Giant salamander (*Megalobatrachus japonicus*)	2
Leopard tortoise (*Testudo pardalis*)	6	Horned frog (*Ceratophrys cornuta*)	2
Agassiz's tortoise (*Testudo agassizii*)	1	Marbled newt (*Triton marmorata*)	2

Statement of the collection

	Mammals	Birds	Reptiles and batrachians	Total
Presented	82	136	12	230
Born	58	41		99
Received in exchange	13	55		68
Purchased	17	43	20	80
On deposit	1		1	2
Total	171	275	33	479

SUMMARY

Animals on hand July 1, 1928	2,273
Accessions during the year	479
Total animals handled	2,752
Deduct loss (by death, return of animals, and exchange)	541
	2,211

Status of collection

	Species	Individuals
Mammals	174	523
Birds	343	1,461
Reptiles and batrachians	62	227
Total	579	2,211

It is planned to erect the reptile house on the site of the old bird house, and this necessitates the razing of the old building, which has been used up to now as a storage house for animals and birds for which there were no other quarters. The destruction of this building will reduce the exhibition space so much that no attempt has been made to enlarge the collection, but rather to select, as replacements for animals and birds that have been lost, only especially desirable species. The result has been that the collection is unusually rich in rare and interesting forms. Exchanges of numerous common species for one or two rarities have been made. These exchanges have been advantageous in reducing congestion as well as improving the quality of the collection.

VISITORS

The estimated attendance as recorded in the daily reports of the park shows considerable increase over the preceding year and included visitors from every State in the Union.

Attendance by months was as follows:

1928		1929	
July	236, 971	February	105, 700
August	196, 200	March	366, 500
September	265, 550	April	295, 339
October	211, 550	May	275, 350
November	78, 050	June	248, 750
December	184, 100		
January	64, 650	Total for year	2, 528, 710

The attendance of organized classes of students was 30,886 from 497 different schools.

IMPROVEMENTS

During the year the work on the exterior of the bird house has been completed, outdoor cages have been constructed, and an attractive approach made to the building. Snow guards have been put on the skylights and the area in the rear of the building has been paved. In connection with this house it was necessary to lay 285 feet of pipe to a culvert.

The lion house and the antelope house have had their roofs recovered, in part with asphalt shingles, and also new gutters installed. It was also necessary during the year to put plastic coating on the roof of the hay shed, the old elephant house, the old bird house, the zebra house, the property house, and the buffalo shed. One of the cages at the old bear yard has been renovated. The office has been painted and redecorated for the first time in 26 years.

Having received a number of suggestions in regard to the bridle paths throughout the park, several consultations were held with those interested in riding and their suggestions followed out as closely as possible in altering these paths.

An appropriation of $220,000 has been made for the construction of a reptile house during the fiscal year 1930, and considerable work has been done on planning this building, which will, when completed, enable us to extend the collection to include reptiles, batrachians, and insects. This building will fill a very great need at the park.

In connection with the construction of the reptile house, the Smithsonian Institution, from its private funds, sent the director of the park and Mr. A. L. Harris, municipal architect, to Europe to study certain zoos. Special attention was given to the planning and construction of reptile houses, but other features were studied and much

information obtained which will be valuable in the development of our own zoo.

In all, 20 zoos were visited, in the following cities: London, Hanover, Hamburg, Copenhagen, Berlin, Dresden, Leipzig, Halle, Vienna, Budapest, Munich, Nuremberg, Frankfort, Cologne, Dusseldorf, Elberfeld, Antwerp, Amsterdam, Rotterdam, and Stellingen.

In London we attended the centenary of the London Zoo, where a notable group of zoologists, including many continental and some American delegates, were gathered. They were entertained by the London Zoological Society at a meeting and later at a memorable dinner in the Zoological Gardens. In all of the zoos visited we were shown the greatest courtesy and given much friendly aid, and by working together on the steamer on the return trip much time was saved in getting together preliminary plans for the reptile house. It is interesting to note that we did not see in Europe a single zoo that impressed us unfavorably. They are all thriving institutions and in nearly all of them new buildings are being added. The collections invariably were excellent.

NEEDS OF THE ZOO

The most urgent need at the present time is an exhibition building for apes, lemurs, and small mammals. There are now almost no quarters for small mammals. These come into the zoo sometimes in great numbers as gifts and include some of the most interesting of all animals. The few that it is possible to exhibit are quartered unsatisfactorily in the monkey house. The great apes, of which the park has a valuable collection, are so placed that it is often impossible for visitors to see them, whereas in a new building they would be housed in modern hygienic quarters, away from the other monkeys and chance of infection. Tentative plans for such a building have been made, and the cost is estimated at $225,000. This building, like the new reptile house, will provide facilities for exhibiting groups of animals for which up to now there has been no place at all.

In our entire building program, which includes besides the above building a pachyderm house, an antelope, buffalo, and wild-cattle house, the completion of the bird house, and the addition of various open-air cages, we are asking only for equipment that practically all modern zoos already possess—simply the necessary facilities of a modern zoological park.

Respectfully submitted.

W. M. Mann, *Director.*

Dr. Charles G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 7

REPORT ON THE ASTROPHYSICAL OBSERVATORY

SIR: I have the honor to submit the following report on the activities of the Astrophysical Observatory for the fiscal year ended June 30, 1929:

PLANT AND OBJECTS

This observatory operates regularly the central station at Washington and two field stations for observing solar radiation on Table Mountain, Calif., and Mount Montezuma, Chile. By arrangement with the National Geographic Society, the director of the observatory has charge of the cooperating solar radiation station of the society on Mount Brukkaros, South West Africa. In addition, the observatory controls a station on Mount Wilson, Calif., where occasional expeditions are sent for special investigations.

The principal aim of the observatory is the exact measurement of the intensity of the radiation of the sun as it is at mean solar distance outside the earth's atmosphere. This is ordinarily called the solar constant of radiation, but the observations of past years by this observatory have proved it variable. As all life as well as the weather depends on solar radiation, the observatory has undertaken the continued measurement of solar variation on all available days. These measurements have now continued all the year round for 11 years, but should continue at least 11 years more to cover the Hale 22.6-year solar cycle. In addition to this principal object, the observatory undertakes spectroscopic researches on radiation and absorption of atmospheric constituents, radiation of special substances such as water vapor, ozone, carbonic-acid gas, liquid water and others, and the radiation of the other stars as well as of the sun.

WORK AT WASHINGTON

Continuous series of solar observations having been made as hitherto at several field stations on desert mountains in distant lands, these observations have been critically studied and prepared for publication at Washington. Several new investigations based on these observations have been made and published, and we have carried

on the preparation and standardization of apparatus. Details follow.

(*a*) *Periodicities in solar variation.*—Observations at Montezuma, in Chile, had been reduced to a consistent and definitive system several years since. This system requires no computations beyond those which the observers make regularly in the field. Telegrams in code are received daily from Montezuma, and when decoded are communicated to the United States Weather Bureau, which publishes on the Washington daily weather map the solar constant value observed 24 hours previously at Montezuma.

In November, 1928, Doctor Abbot assembled the monthly mean solar constant values of 101 consecutive months ending with October, 1928, and plotted them in the form of a curve. This curve Dr. Dayton C. Miller, of Cleveland, was kind enough to analyze by means of his ingenious and accurate machine, so as to bring out the first 30 harmonic constituents, which, combined, approximately represent the original curve.

From a previous analysis of 77 months, made in 1926, it had appeared that periods of about 26, 15, and 11 months and the submultiples of these periods were all the periods under 26 months that seemed to have continuous existence in the solar variation. Accordingly, the interval of 101 months had been purposely chosen as nearly a common multiple, so that if these periods were still persistent they might be brought out as approximately the fourth, the seventh, and the ninth harmonics, with their overtones.

Figure 2 shows the result of this analysis. The zigzag line A represents the original monthly mean of observations, and the 30 sinuous curves below are the harmonics. Until a longer interval of observation shall be available for analysis, it is not considered desirable to discuss periodicities longer than $\frac{101}{4}$ months. The reader will perceive that if we therefore neglect the march of the first, second, and third harmonics, the fourth, its overtones the eighth, twelfth, and sixteenth; the seventh, its overtones the fourteenth, twenty-first, and twenty-eighth; and the ninth and its approximate overtones the nineteenth and twenty-seventh are really the most prominent features, whereas some of the other harmonics, such as the fifth, sixth, tenth, eleventh, thirteenth, seventeenth, eighteenth, twentieth, twenty-fourth, twenty-sixth, and twenty-ninth, not included in these three series of overtones, nearly vanish. Indeed, apart from those named in connection with the fourth, the seventh, and the ninth, only the twelfth, fifteenth, twenty-third, and twenty-fifth seem to be of appreciable significance. This suggests that the third and its overtones may also have real significance. It is of great

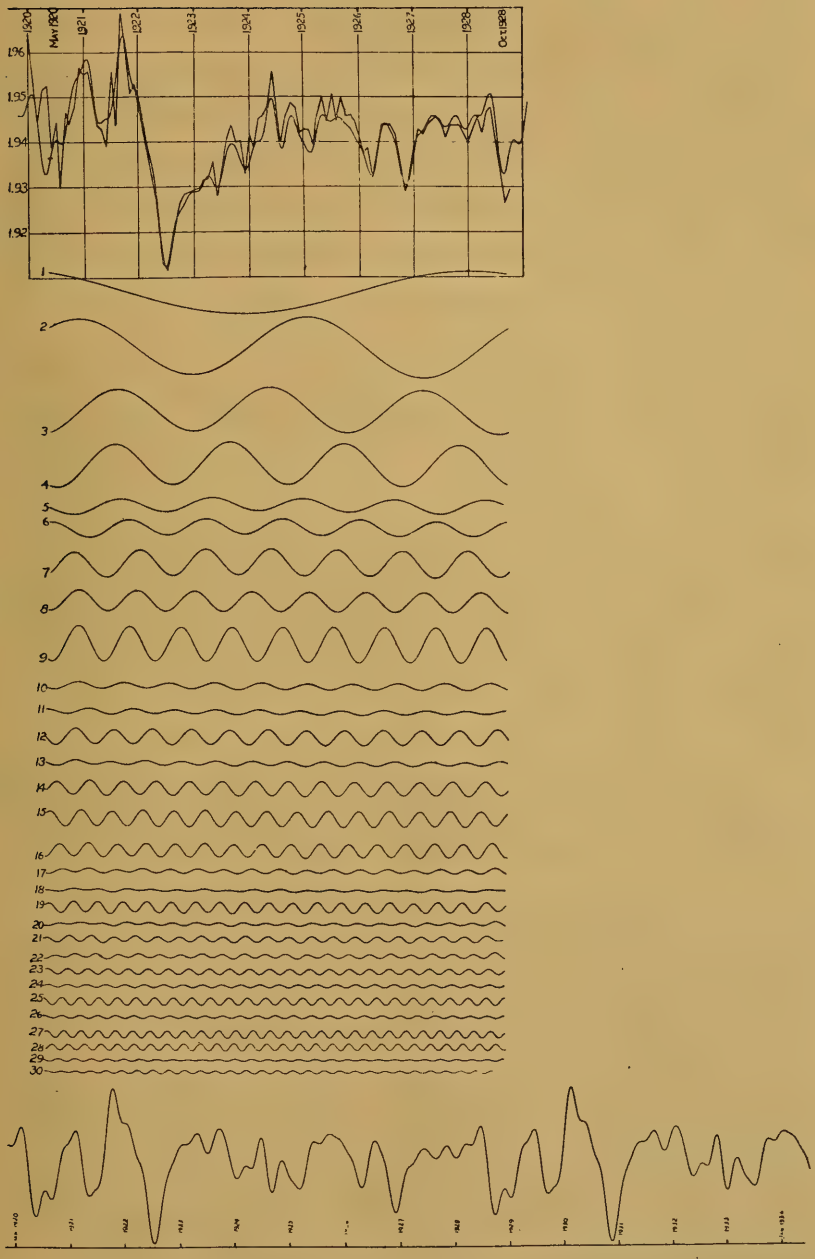

FIGURE 2.—Periodicities in solar variation

interest to note that the periods corresponding to the fourth, the seventh, and the ninth harmonics, which we find so well marked in solar variation, have also been particularly noted by students of the march of weather and crop phenomena.

Assuming that the harmonics from the fourth to the thirtieth represent all the real regular periodicites in the variation of solar radiation, the curve B, at the foot of the diagram, which is their summation, represents the march of this periodic part of solar variation. Continuing it to cover the years 1929, 1930, and 1931, we are led to anticipate features of uncommon interest in the march of solar variation in the period just approaching. It will, indeed, be exceedingly interesting to see to what degree this forecast is verified.

(*b*) *Reduction of Table Mountain observations.*—Observations at Table Mountain, Calif., which have continued since December, 1925, have been critically studied at great length during the past year by Mr. Fowle and the computers. Mr. Fowle has considered that the results might be affected by three variable atmospheric elements—the water vapor, the haze, and the ozone which occurs in the very high atmosphere. It was easy to arrange the data in groups corresponding to gradual increase of quantities of atmospheric water vapor, for this vapor is readily measured and expressed as total precipitable water by Fowle's method which he worked out from spectroscopic study in the laboratory many years ago. By such statistical arrangement, corrections for precipitable water were sought to be obtained.

However, there is one obstacle depending on the contemporaneous real variability of the sun which hinders immediate estimation of water-vapor influence. True, this solar variability might have been eliminated by employing the definitive results of Montezuma, but we avoided this procedure, since, in the opinion of some, it might not have left the Table Mountain observations fully independent. Accordingly, the solar variation was roughly estimated from Table Mountain pyrheliometry alone, after the method referred to in my report for 1926, page 116. Allowance was thus made for the solar variation before determining the water-vapor effect.

When these steps had been taken it became clear that a sudden increase of the Table Mountain solar constant values had been indicated about August 12, 1927. This change of scale continued with apparently increasing departures thereafter. No parallel result having been noted at Montezuma, every contributary element of the measurements at Table Mountain was investigated to learn the source of the discrepancy. It was soon found that the change was due to a large change in the scale of pyranometer measurements of the brightness of the sky near the sun. Yet redeterminations of the

constants of the pyranometer itself by observing solar radiation with it gave excellent agreement with previous values. Very numerous experiments and comparisons were made at Table Mountain in the effort to trace the cause of the discrepancy. These were without result until September, 1928, when Doctor Abbot visited the station and observed that portions of the vestibule of the instrument had become shiny by handling. Hence sunlight in addition to sky light was reaching the sensitive measuring strip. By reblackening the limiting diaphragm nearly all of this error was removed.

It was now necessary to perform a great mass of statistical computing in order to determine the magnitude of the pyranometer error at different dates. Fortunately, an error of 20 per cent in pyranometry makes but 1 per cent error in the solar constant, so that no great accuracy of determining the error was required. Hence it appeared sufficient to collect all the pyranometer values of each month, arranging them in orders of atmospheric humidity, air-mass, and pyrheliometer value, and to compare the mean pyranometer values of corresponding months in successive years, as well as the values in nearly identical sky conditions throughout each year.

It soon became clear that no change in the instrument had occurred prior to early August, 1927. At that time there had been many experimental comparisons involving handling of the vestibule, which had done the damage and led to the sudden change. Afterwards many more comparisons were made to find the trouble, and these had aggravated it. After much work it became possible to determine a set of sufficiently exact corrections to the pyranometry of 1927 and 1928 suitable to each of the 13 months during which they were needed. These studies were made on Table Mountain observations exclusively, so that they introduced no element of dependence on Montezuma.

To prevent a future mischance of this kind, imperative orders were issued to all stations as to the handling of instruments, and standard instruments, for comparison purposes only, were added to the equipment, with instructions to make fairly frequent comparisons between these and the instruments in use.

(*c*) *Asmospheric ozone.*—Mr. Fowle, having become impressed that the variations recently investigated by Dobson in the quantity of atmospheric ozone might very possibly affect the observed solar constant, made a fruitful investigation of the absorption of ozone in the yellow and green of the solar spectrum.[1] He found that this absorption, though small, is clearly and quantitatively indicated by means of the atmospheric transmission coefficients obtained in the application of the fundamental long method of solar constant determination invented by Langley. As we frequently employ this

[1] Published in Smithsonian Misc. Coll., vol. 81, No. 11, 1929.

method at all stations as a check on the short method in daily use, Fowle was able to determine the atmospheric ozone at Calama, Montezuma, Harqua Hala, and Table Mountain on very many occasions since the year 1920.

It proved, harmoniously to what Dobson had found, that the ozone above Mount Montezuma is meager and nearly invariable in quantity, but that above Harqua Hala and Table Mountain it is much more plentiful and very variable. Having compared the variations of monthly mean ozone values with the Table Mountain observations of corresponding variations of solar constant values, Mr. Fowle found a strong correlation between them. As the yearly march of the monthly mean ozone values at these northern stations appears to be a terrestrial phenomenon, a fact entirely harmonious to those well established by Dobson, it seemed entirely legitimate to introduce a solar constant correction, statistically determined, to allow for ozone in much the same way as for water vapor, for the Harqua Hala values.

(*d*) *Concordant results of Table Mountain and Montezuma.*—This having been done, and the water-vapor and haziness corrections having been applied, it was found that the absolutely independent final values of the solar constant determined at two stations 4,000 miles apart (viz, Table Mountain, 7,500 feet high, in California, and Montezuma, 9,000 feet high, in Chile) march with gratifying accord. For the *ratios* of the values determined at the two stations show no appreciable indication of a *yearly* range, although winter at the one station corresponds with summer at the other. Furthermore, the total *range* of straggle of nine-tenths of the *daily* ratios of these independent values *does not exceed 1.1 per cent.* This involves the conclusion that the *total range of accidental error* at a single station seldom exceeds 0.8 per cent, and therefore the probable value of the accidental determination of a single day at one station is less than 0.3 per cent. This being so, we are prepared to expect that both stations, though wholly independent, must concur within narrow limits in their determination of the sun's variation.

(*e*) *Preparation of Volume V of the Annals.*—With this gratifying conclusion reached in the final discussion of the results of two independent solar observing stations remote from each other, a point seems to be reached where it is proper to publish Volume V of the Annals of the Astrophysical Observatory, to contain the numerous observations obtained since the year 1920. Doctor Abbot has been engaged on the preparation of this text, and it is hoped that the volume will be ready to publish in the fiscal year ending June, 1931, thus including a full decade of observations.

(*f*) *Other work at Washington.*—As usual, many instruments have been constructed at Washington for research purposes. These in-

clude a number of silver-disk pyrheliometers, prepared at the expense of the private funds of the Institution, but standardized against the standard instruments of the Astrophysical Observatory, and sold at cost to research institutions of various lands.

Mr. Aldrich has assumed charge of the instrument making and standardizing. He has also continued work on the fruitful investigation of the radiation and cooling of the human body, referred to last year. In addition he has assisted in reducing solar-constant observations, and has attended to the considerable correspondence on physical and astronomical matters.

FIELD WORK

(*a*) *At Mount Wilson, Calif.*—Doctor Abbot spent the months of July, August, and part of September, 1928, at Mount Wilson, Calif., where he was assisted by Mr. Freeman. Besides improving the solar cooker to greatly increased efficiency, two considerable researches were carried through. The first of these is the repetition of the bolometric determination of positions of solar and terrestrial absorption lines and bands in the infra-red solar spectrum. This had formed the main subject of Volume I of the Annals of the Astrophysical Observatory. As photography has not as yet reached far beyond the extreme red of the spectrum, the best means of observing these interesting lines and bands of the infra-red lies in measuring the cooling which attends them. For this purpose a well-dispersed spectrum is caused to march slowly over a sensitive linear bolometer strip, and a continuous curve indicating its temperature is automatically recorded. As the bolometer strip falls into each successive one of the lines of the spectrum, a nick comes in the curve.

Three approximately 60° flint-glass prisms in tandem were used to disperse the solar rays, and long-focus mirrors to collimate and focus the spectrum. Five photographic plates, each 60 centimeters long, were required to cover the spectrum from "A" in the red to "Ω" in the infra-red. Mr. Freeman did most of the final observing, and also measured the plates. Over 1,200 lines and bands of absorption were discovered, where only about 550 had been found in the earlier investigation published in 1900. A paper on this new work has been published as volume 82, No. 1, of the Smithsonian Miscellaneous Collections.

The other research carried through was the observation of the distribution of energy in the spectra of 18 stars and of the planets Mars and Jupiter. This was accomplished by Doctor Abbot with the aid of Doctor Adams, of Mount Wilson Observatory, employing the 100-inch telescope and a sensitive radiometer.

Greatly increased sensitiveness had been hoped for by substituting hydrogen for air, and an excessively light and small radiometer

system, built up with house flies' wings, for the somewhat larger mica-vane instrument employed by Doctor Abbot in 1923. With these improvements it was hoped that stars of the fourth or even fifth magnitude would be observable. These hopes were not altogether realized. The sensitiveness was potentially attained, but, unfortunately, could not be made available during the time of the experiments because a persistent slight charge of electricity which could not be removed created a governing field, which reduced the time of single swing of the system from about 10 seconds to only 1.5 seconds during the experiments. On this account the deflections in the stellar spectra were regrettably small. Nevertheless, with the special observing scale which had been devised, very satisfactory results were reached, and in one case on a star of only 3.8 magnitude. These observations have been published in the Astrophysical Journal for May, 1929.

(*b*) *Montezuma station.*—During the autumn of 1928 the apparatus at Montezuma seemed to grow insensitive, so that a critical inspection appeared necessary. By the generous financial assistance of Mr. John A. Roebling, it was possible to send Mr. Aldrich to Chile. This expedition occupied him from January to March, 1929. He rebuilt the galvanometer and repaired and adjusted other instruments until everything was in satisfactory condition. Excellent results have been coming in regularly of the Montezuma observations on the solar constant of radiation. These are published daily by the United States Weather Bureau.

(*c*) *Table Mountain station.*—The unfortunate trouble with the pyranometer at Table Mountain has already been described. Notwithstanding this, the results as now reduced seem satisfactory and are very numerous. Indeed, on several occasions Table Mountain has furnished consecutive daily runs of solar-constant determinations exceeding 50 days and once exceeding 70 days.

The Dobson ozone apparatus, owned by the Smithsonian and formerly in use at Montezuma, was returned to England for readjustment by Doctor Dobson. It was reinstalled at Table Mountain in the autumn of 1928 and daily determinations of atmospheric ozone have been made with it whenever possible since then. These measurements show in contrast with those formerly made at Montezuma about as much ozone in the higher atmosphere above California as has been found in Europe. Also, in contrast with Montezuma and in harmony with Europe, they show a decidedly variable quantity of ozone from day to day and from month to month. These ozone determinations will be continued at Table Mountain indefinitely.

(*d*) *Mount Brukkaros.*—The National Geographic station on Mount Brukkaros, South West Africa, which cooperates with Montezuma and Table Mountain in the daily observation of the solar

constant of radiation, has continued regular observations and has sent to Washington a large collection of records. These will be statistically and critically studied and prepared for publication.

As the observers, Messrs. Hoover and Greeley, have been three years in this African field, arrangements have been made for Messrs. Sordahl and Froiland to relieve them in August, 1929.

PERSONNEL

At the stations Mr. A. F. Moore has continued in charge at Table Mountain and Mr. H. H. Zodtner at Montezuma. Mr. Moore was assisted mainly by Mr. L. O. Sordahl, and after his departure, in June, 1929, by Dr. W. Weniger. Mr. Zodtner was assisted until April 1 by Mr. M. K. Baughman and after his resignation by Mr. C. P. Butler.

At Washington the force has remained unchanged, with three exceptions. Mrs. A. M. Bond resigned as computor on February 5, 1929. She was succeeded on February 18 by Miss M. Denoyer. Mr. H. B. Freeman, formerly in charge of Montezuma station, assisted at Mount Wilson and at Washington until May 1, 1929, when he obtained a transfer to the laboratories of the National Advisory Committee for Aeronautics at Langley Field, Va.

SUMMARY

The year has been notable for the satisfactory continuation at field stations of observations for the study of the variability of the sun; for the satisfactory completion of the critical statistical investigation of the results obtained at Table Mountain, so that hereafter Table Mountain observations may be definitively reduced by field observers; for the excellent accord found between definitive results of Table Mountain and Montezuma (stations 4,000 miles apart in opposite hemispheres) in their indications of solar variability; for the apparent confirmation of three definite periodicities of approximately 11, 15, and 26 months in solar variation; for the discovery of a new method of measuring the atmospheric ozone and its influence on solar-constant observations; for the repetition of a former investigation of solar and terrestrial absorption lines and bands in the solar spectrum, but with nearly threefold richer results; and for the observation of the distribution of energy in the spectra of 18 stars and two planets.

Respectfully submitted.

C. G. Abbot,
Director, Astrophysical Observatory.

The Secretary,
Smithsonian Institution.

APPENDIX 8

REPORT ON THE DIVISION OF RADIATION AND ORGANISMS

SIR: I have the honor to report the initial development of the new Division of Radiation and Organisms entered upon May 1, 1929.

The purpose of this division is to undertake those investigations of, or directly related to, living organisms wherein radiation enters as an important factor. Through the development of a thoroughly equipped physical and chemical laboratory wherein the spectroscopic side is most emphasized, investigations of biological problems can be undertaken more effectively than has generally been possible. Through the cooperation of men of diverse training in the fundamental, as well as the immediate biological sciences, it is hoped to secure the fullest advantage of modern specialization, which generally, on the contrary, presents a formidable handicap to work in border line fields.

The program of investigations falls into two main divisions:

I. Direct investigation upon living organisms.
II. Fundamental investigations related to biological problems.
    1. Molecular structure investigations.
    2. Photochemical investigations.

Direct investigations upon living organisms will, for the present, be concerned with the growth of plants under rigidly controlled physical and chemical conditions. Soil will be replaced by nutrient solutions of known constitution. The gases supplied to the plants will be of known and controlled amounts. Not only the temperature and humidity but the intensity and color of the light is to be measured and varied during the experiments.

Understanding of biological problems is greatly hampered by the lack of knowledge of the structure of the more complicated molecules which are a part of living organisms, and by a lack of knowledge of even the simpler chemical reactions brought about, or contributed to, by radiant energy. The most promising possibility for adding to our knowledge of molecular structure is offered by spectroscopic investigations; that is, through the study of the radiation arising from the internal vibrations of the molecules themselves. The study of photochemical phenomena requires both spectroscopic and chemical equipment.

All these investigations in common require a spectroscopic laboratory supported by both physical and chemical departments.

LABORATORIES

Space in the basement of the west wing of the Smithsonian Building, previously used for storage, is being renovated and equipped for laboratory purposes. Because of the very heavy walls, and the fact that the rooms are partially under ground, this space is peculiarly suited to the purpose, owing to its evenness of temperature. A large room on the north side will accommodate the plant-growth chambers, spectrographs, and photometer rooms. Adjoining, a small room will serve as dark room and enlarging room. Two smaller rooms on the south side of the wing complete the assignment of space. One of these is to be a physical laboratory accommodating infra-red recording spectroscopes and general manipulative equipment. The other of the smaller rooms has been subdivided, the larger portion to serve as a chemical laboratory and the smaller as a glass-blowing room.

The renovation of these rooms, subdivision, extension of plumbing, and construction of the very heavy electrical arteries required for the artificial illumination of the plants has been ably carried out by the National Museum personnel.

EQUIPMENT

The purchase of general equipment is nearing completion. Plans have been drawn up for a preconditioning chamber and construction has been begun. Drawings have been made for the actual growth chambers and bids are under consideration. Special apparatus for the construction of radiation-detecting devices is being made. Gratings for spectroscopic investigations are being purchased from the Johns Hopkins University. Much of the equipment formerly used in the infra-red investigation of Langley, Abbot, and Fowle will be used for the molecular-structure investigations through the courtesy of the Astrophysical Observatory.

FINANCIAL

The major portion of the expense for the coming year, approximating $20,000, will be cared for by means of grants from the Research Corporation. Of this sum approximately $12,000 will be spent upon salaries and the remaining $8,000 upon equipment. As the work develops it is hoped that it will so commend itself that larger means may become available.

ORGANIZATION

Personnel.—The present personnel is as follows:

Research associate, Dr. F. S. Brackett.
Consulting plant physiologist, Dr. E. S. Johnston.
Research assistant, L. B. Clark.
Stenographer and laboratory assistant, Miss V. P. Stanley.

Dr. F. S. Brackett took charge of this work under Doctor Abbot's direction May 1, his experience being chiefly physical and, more particularly, spectroscopic. Through the cordial cooperation of the agricultural experiment station of the University of Maryland, Dr. E. S. Johnston is directing the biological aspects of the investigation. In all this work the technical aspects involved in the development of new equipment will play a very important part. For this work the services of Mr. L. B. Clark have been secured, whose varied experience peculiarly fits him for such an undertaking.

Cooperation.—During some months previous to the initiation of this work in the Smithsonian, Doctor Brackett directed the development of several lines of research in the Fixed Nitrogen Laboratory closely related to those to be undertaken in this division. This work is being carried on by that laboratory now, in very close cooperation with the Smithsonian.

Respectfully submitted.

F. S. Brackett,
Research Associate in Charge.

Dr. C. G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 9

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE

SIR: I have the honor to submit herewith the following report on the operations of the United States Regional Bureau of the International Catalogue of Scientific Literature for the fiscal year ended June 30, 1929:

Continuing the policy of keeping the expenditures of the bureau at a minimum until actual publication is resumed, the work here has consisted mainly in keeping necessary records of current scientific publications, preparing data for a revised list of journals, and other necessary routine matters, so that the actual work of indexing may be taken up by a full force as soon as reorganization of the enterprise is possible.

The gross expenditure for the year was $5,060.75 out of the appropriation of $7,460.

At the international convention of the International Catalogue of Scientific Literature held in Brussels July 22–24, 1922, the delegates officially representing the countries taking part in the enterprise anticipated that financial conditions would allow resumption of publication of the catalogue as soon as the financial chaos then existing should become stabilized. Looking forward to this event, they resolved to keep the organization alive by agreeing to continue the work of their regional bureaus so far as possible until financial support could be obtained. In Europe money to promote such scientific enterprises is still unobtainable; therefore, it appears that if this great bibliographical service is to be resumed aid must be extended from the United States, and that the time has come for this country to take the lead, not only in outlining a definite scheme for reorganization but in suggesting a possible means of obtaining necessary financial support. As a preliminary step this bureau has been in communication with Prof. Henry E. Armstrong, F. R. S., chairman of the executive committee, in whom the Brussels convention vested authority to consider and propose plans for resuming publication. In a letter on July 6, 1929, the writer stated:

I know, of course, how hard pressed all foreign countries have been financially, but the sums involved are so small and the results aimed at so valuable

and so greatly needed that I can not but believe that if some definite and concerted move is made now we can reorganize and renew this great work.

In his reply Professor Armstrong reflects the financial despondency of Europe but goes on to say:

I wish it were possible to restart the International Catalogue, but I am bound to confess that I see no immediate prospect of doing so. Still, I would prophesy that it must again come into being—the idea was too grand and the proof obtained that the enterprise was entirely feasible too complete for it to remain an act unaccomplished. If the nations are ever to unite it must be in the field of natural science before anything else.

An outline of the present situation is briefly this: Publication of the International Catalogue of Scientific Literature began in 1901, when 33 of the leading countries of the world cooperated by establishing regional bureaus and furnishing to the central bureau in London classified index references to the scientific literature of their respective regions and further agreed to subscribe to a sufficient number of sets of the catalogue to support the central bureau and pay the cost of printing. Beginning with the literature of 1901, 17 volumes were published annually until the last volume of the fourteenth annual issue, indexing the literature of 1914, was published in 1922, making a total of 238 volumes, together with several extra volumes containing lists of journals and classification schedules.

The regional bureaus were supported locally, in most cases, by direct governmental grants, while the central bureau derived its sole support from the income received from subscribers to the catalogue, the price of which was equivalent to $85 per year for the complete set of 17 volumes. Just prior to the war central bureau receipts and expenditures approximately balanced, but after war began printing costs doubled, and it was therefore necessary to suspend publication in 1922.

The Royal Society of London acted as financial sponsor of the enterprise from the beginning, aided on several occasions by donations from other sources after war began.

The need of the International Catalogue of Scientific Literature is obvious, as no publication ever existed so broad in scope or exhaustive in treatment and none has since taken its place.

The various abstract journals do not meet the need of libraries as reference aids, as they overlap their respective fields and in aggregate are too bulky, expensive, and dissimilar in plan to serve as general works of reference. Abstract journals serve the immediate need of specialists but do not meet the requirements of librarians or general students.

Before outlining a scheme for reorganization and improvement for the future, a retrospect of the work may be considered and defects noted in order that they may be eliminated in the future.

The organization was started on very limited and borrowed capital, which greatly added to the cost of production, as it was necessary to have all printing done by private firms. The cost of subscription, $85 per year, placed the work beyond the means of many small libraries and individual workers. It was originally intended to make the several volumes yearbooks of their respective fields, and much of the value and use of the work was lost owing to the fact that many of the volumes were delayed in their publication. This vital defect may be remedied by having editing and publishing done by the same organization. To accomplish this, it will be necessary to own a printing plant designed and equipped solely for this purpose. This will make possible continuous and prompt printing at a minimum cost and so reduce the cost that it will be possible to offer the catalogue to subscribers for $50 per set instead of $85, if an edition of 1,000 sets can be sold.

Estimates of the cost of equipping and operating a suitable printing plant have been made by several printers and publishers in this country and by the two leading manufacturers of typesetting machines. These estimates were almost identical, and from them it appears that a suitably equipped plant can be installed for less than $30,000, in which, when properly manned, a catalogue aggregating 10,000 pages a year can be published for $17,500 in an edition of 1,000. This sum includes cost of labor, paper, repairs, and incidentals. To this sum must be added $15,000 for the annual expenses of the central bureau for one year with which to pay rent and the executive and editorial staffs and, say $12,500 as a liberal reserve to meet incidental and unforseen expenses which always occur in beginning any new enterprise. It thus appears that the money needed is—

For installing and equipping the printing plant		$30,000
Expenses for printing and publishing for one year	$17,500	
Maintenance of central bureau for one year	15,000	
Allowance for unforseen incidentals	12,500	
		45,000
Total capital needed for first year		75,000

After the first year, to continue the work would cost approximately $35,000 per year, leaving a margin of $15,000 per year between the cost of production and the estimated receipts if the total edition of 1,000 copies can be sold. This amount, together with sums derived from the first year sales already included in the estimates, could be made a sinking fund with which to repay donors.

Should publication be resumed it is expected that a demand for the first 14 annual issues will arise, and as there is a large supply of them now at the central bureau, money received from this source

may be used to repay the Royal Society of London for the sums advanced for their publication.

The necessary steps to be taken leading to reorganization and resumption of publication appear to be the following:

(1) Preparation by the existing executive committee of a definite course and detailed plan of reorganization and operation.
(2) Obtaining promises of cooperation from the various regional bureaus to again furnish the necessary data for the catalogue.
(3) Canvassing possible fields for subscriptions and the necessary financial aid.

Obviously, capital is essential before any actual work can be begun, but definite plans may be prepared by those now vested with authority to act, and when this part of the work has progressed sufficiently to be able to submit a definite and concise prospectus to subscribers and possible donors it is proposed to solicit support from both.

Respectfully submitted.

LEONARD C. GUNNELL,
Assistant in Charge.

DR. CHARLES G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 10

REPORT ON THE LIBRARY

SIR: I have the honor to submit the following report on the activities of the library of the Smithsonian Institution for the fiscal year ended June 30, 1929:

THE LIBRARY

The Smithsonian library, or, speaking in terms that accord more exactly with the recent reorganization of the library, the Smithsonian library system, is made up of 10 divisional and 36 sectional libraries. The former consist of the Smithsonian deposit in the Library of Congress, which is the main library of the Institution; the library of the United States National Museum; the Smithsonian office library; the Langley aeronautical library; the radiation and organisms library; and the libraries of the Astrophysical Observatory, the Bureau of American Ethnology, the National Gallery of Art, the Freer Gallery of Art, and the National Zoological Park. The sectional libraries are the immediate working tools of the curators in the National Museum. These 46 libraries taken together, including the collections not yet catalogued, comprise about 800,000 volumes, pamphlets, and charts. Although they contain thousands of publications on history, philosophy, literature, and the fine arts, they are largely scientific and technological in character, among them being many society and serial publications. Not only is this great collection an invaluable instrument in the work of the Institution and the Government, but it is freely available both to scholars and to the public generally for research purposes.

The composition of the Smithsonian library underwent several important changes during the past year. The library of the Bureau of American Ethnology became a division of the library; the library of radiation and organisms, designed for the use of a new branch of Smithsonian activity, was organized as a divisional library; and the technological library was made a part of the library of the National Museum.

THE STAFF

Early in the year the second position of assistant librarian—that of chief of the accessions department—was established and was filled

by the appointment of Miss Ethel A. L. Lacy, a graduate of the University of Michigan, who had had many years of experience in the library of the Department of Agriculture and the Detroit Public Library.

Mrs. Hope Hanna Simmons was given a permanent position as junior library assistant and was placed in charge of the reading and reference room in the Arts and Industries Building.

Miss Agnes Auth, minor library assistant, after 10 years of faithful service in the library, was appointed to a higher position in the disbursing office of the Institution.

Mr. Herschel Chappell, assistant messenger, was advanced to a position in the office of the chief clerk. He was succeeded by Mr. William Oliver Grant.

Several members of the staff were granted brief periods of leave for travel and study. Miss Elisabeth Hobbs spent some weeks in England, and Miss Mary D. Ashton in Oregon, while Miss Ruth Wenger attended advanced courses in library science at the University of California.

In the course of the year the following persons were employed temporarily: Miss Helen V. Barnes, Mr. Alan Blanchard, Mr. Dale Hawarth, Mr. Thomas Hickok, Mr. John Paschall, Mrs. M. Landon Reed, Miss Jennette Seiler, Mrs. Hope H. Simmons, and Mr. Clyde Williams.

EXCHANGE OF PUBLICATIONS

Nearly all of the publications currently received by the various libraries in the Smithsonian system are sent by editors of journals and by learned institutions and societies throughout the world in exchange for the publications of the Institution and its branches. This exchange has been, from the early days of the Institution, the chief means of increasing its library, and has brought to it a wealth of scientific material. This has come partly by mail, but mainly through the International Exchange Service, which is administered by the Institution.

During the last fiscal year the Smithsonian library received 30,502 packages, of one or more publications each. After the packages had been opened the items were entered, stamped, and sent to the proper divisions and sections of the library, but chiefly to the Smithsonian deposit in the Library of Congress and the library of the United States National Museum. Most of the 1,316 letters and the thousands of acknowledgments written by the library during the year had to do with this exchange of publications. Exchange relations were taken up with many new societies and with many old societies for new publications.

Among the items received were dissertations from the universities of Berlin, Bern, Breslau, Bonn, Cornell, Erlangen, Freiberg, Giessen, Halle, Helsingfors, Johns Hopkins, Kiel, Leipzig, Louvain, Neuchâtel, Pennsylvania, Rostock, Strasbourg, Tubingen, Utrecht, Wurzburg, and Zürich; and from technical schools at Berlin, Bonn, Braunschweig, Darmstadt, Dresden, Freiberg, Karlsruhe, and Zürich.

GIFTS

The outstanding gift of the year was that of the Harriman Alaskan library. This is the collection relating to Alaska and the Arctic regions made by Dr. William H. Dall, late curator in the National Museum, who for nearly a lifetime was a student of the regions of the north. It consists of approximately 1,100 volumes and pamphlets, together with 30 or more scrapbooks of letters and newspaper clippings. It is rich in works on exploration and discovery, and contains many rare items, including a file of the Alaska Herald from 1868 to 1875. The library was purchased and presented to the Institution by Mrs. Edward H. Harriman, whose husband, it will be remembered, made possible by his generosity the famous Harriman expedition to Alaska in 1899, in which Doctor Dall and other scientists from the Smithsonian Institution and the Washington Academy of Sciences took a leading part, and the results of which the Institution published later in a monumental work. The library will be made available for reference at the earliest possible moment.

Also prominent among the gifts were these: 1,000 publications and manuscripts of a miscellaneous character, from Mr. Herbert A. Gill, of Washington, D. C., brother of the late Dr. Theodore Gill, at one time librarian and associate in zoology at the Smithsonian Institution; 500 books and periodicals on photography, from Mr. A. B. Stebbins, of Canisteo, N. Y.; two sets of the first four volumes of the Smithsonian Scientific Series, Patrons' Edition, from the Smithsonian Institution; several hundred scientific publications, many in continuation of series already given, from the American Association for the Advancement of Science, the Hygienic Laboratory, and the Geophysical Laboratory; and about 1,500 publications of the Philosophical Society of Washington, from the society itself, to be used for completing sets in the library, for exchange, or for free distribution.

Many other gifts were received, including copies of the following: The phototype edition of Codex Argenteus Upsaliensis, recently issued by the Royal University of Upsala in order to celebrate its four hundred and fiftieth anniversary, from the University; Innermost Asia—a detailed report, in four volumes, of explorations in Central Asia, Kan-su, and Eastern Iran, carried out and described under the orders of H. M. Indian Government by Sir Aurel Stein,

of the Indian Archaeological Survey—presented by the secretary to the High Commissioner for India; North American Wild Flowers, volume 4, by Mary Vaux Walcott, from the artist-author; A Link with Magellan, being a chart of the East Indies, C. 1522, in the possession of Boies Penrose, from Mr. Penrose; Enthronement of the One Hundred Twenty-fourth Emperor of Japan, from the Japan Advertiser, Tokyo; and Metropolitan Museum Color-prints, series 1–8, with several other publications, from the Metropolitan Museum of Art.

Among donors on the staff of the Institution and its branches were Dr. Charles G. Abbot, secretary of the Smithsonian, and Dr. William H. Holmes, director of the National Gallery of Art, who, as in previous years, were generous contributors of publications of different kinds; Dr. Charles W. Richmond, who gave many volumes, some quite rare, chiefly on ornithology; and Miss Mary J. Rathbun, whose gifts during the year increased her total gifts to the library to more than 200 pieces, exclusive of her own publications. Still other gifts came from Assistant Secretary Wetmore, Mr. W. de C. Ravenel, Dr. R. S. Bassler, Dr. F. W. Clarke, Mr. Paul Garber, Dr. J. W. Gidley, Mr. A. J. Olmsted, Mr. J. H. Riley, Miss Louise A. Rosenbusch, Dr. Waldo L. Schmitt, and Mr. Ralph Smith.

OFFICE LIBRARY

The office library, which is made up of the publications of the Institution and its branches, various sets of society publications, the art-room collection, the employees' library, and many works of reference, some of which are in the reference room in the Smithsonian Building and the rest in other parts of the library or in the administrative offices of the Institution, is one of the most used of the libraries in the Smithsonian system. Especially is this true of the employees' collection, which is now shelved in the reading room of the Arts and Industries Building. The usefulness of this collection was greatly increased during the last year by generous loans of current works of general literature from the Library of Congress. These loans were so much appreciated by the Smithsonian staff that it is hoped they will become a permanent feature in the cooperation of the two institutions. To the office library were added 144 volumes and 16 pamphlets. The binding of volumes for the library, which had been discontinued for several years for lack of funds, was resumed and 41 volumes were bound.

SMITHSONIAN DEPOSIT

The Smithsonian deposit in the Library of Congress is the largest and most important unit in the Smithsonian library system, number-

ing about 500,000 volumes, pamphlets, and charts, besides many volumes awaiting completion. This collection, which began with the founding of the Institution in 1846, was housed in the Smithsonian Building until 1866. In that year it had grown to 40,000 volumes, and was, by permission of Congress, deposited in the Library of Congress. Since that time it has been steadily increased by additions from the Institution. While it is somewhat general in character, its interest is mainly scientific, and it is rich in serial publications and monographs, and especially in the reports, proceedings, and transactions of the learned societies and institutions of the world, being one of the foremost collections of its kind. Although, of course, distributed throughout the Library of Congress according to classification, the deposit is, because of its prevailingly scientific nature, chiefly in the Smithsonian division, which was established in 1900 to take care of the scientific publications both of the deposit and of the Library of Congress.

During the last fiscal year the Institution sent to the deposit 19,003 publications, comprising 3,569 volumes, 9,506 parts of volumes, 5,616 pamphlets, and 312 charts. Documents of foreign governments, largely statistical in character, to the number of about 4,000, were also forwarded, without being stamped or entered, to the document division of the Library of Congress. Among the items sent to the deposit were 1,110 volumes in Japanese on education, several hundred in Russian on various subjects, and 56 in Turkish. The last had been presented to the Institution many years before by H. I. M. the Sultan Abdul-Hamid II. Among them, too, were 4,729 dissertations from 30 universities and technical schools at home and abroad. The publications also included a large number intended for use in building up reserve sets. Some of these were taken from the duplicates in the Smithsonian Building, which have lately been made available; others from the publications recently given to the Institution by the American Association for the Advancement of Science. It is particularly pleasing to report that, as the result of the reorganization of the accessions department of the library, nearly twice as many volumes and parts were obtained in response to requests from the deposit as were obtained the year before.

NATIONAL MUSEUM LIBRARY

The library of the United States National Museum, which consists, in the main, of works on natural history and mechanical and mineral technology, is housed partly in the Natural History Building and partly in the Arts and Industries Building. In addition to the two main collections it includes 36 smaller collections, which are the sectional libraries of the curators. The library contains 74,562 vol-

umes and 107,629 pamphlets. It was increased during the past year by 2,247 volumes and 748 pamphlets. Some of the additions came by purchase and gift, but most by exchange.

The current work was kept up as usual, but often by a depleted force. The staff entered 9,759 parts of periodicals, catalogued 1,422 volumes and pamphlets, and had 1,331 volumes bound. They sent to the sectional libraries 5,518 publications and loaned to the curators and their assistants 4,793, of which 2,163 were borrowed from the Library of Congress and 271 elsewhere. They returned 2,336 books to the Library of Congress and 299 to other libraries. About 200 publications were loaned to Government libraries and to libraries outside of Washington. Among the latter were those of the American Museum of Natural History, Carnegie Museum, Field Museum, Department of Agriculture of Canada, E. I. du Pont de Nemours & Co. Experimental Station, and the following colleges and universities: Buffalo, California, Goucher, Minnesota, and Princeton. One loan to the Field Museum consisted of a duplicate set, in 43 volumes, of Linnaea, Berlin, 1825–1882, and was made on semipermanent charge. It was the third loan of the kind during the last three years, the others having been made to Johns Hopkins University and the University of Chicago. All three were for the furthering of specialized scientific research, in keeping with the general purpose of the Museum, as a branch of the Smithsonian Institution, of increasing and diffusing knowledge.

About as many publications as usual were consulted in the library. But there was a marked growth in the reference and informational service rendered by the staff, not only to the scientists of the Institution and to investigators from different departments of the Government, but to scholars generally and to inquirers throughout the country. In this connection special attention should be called to the growing importance, both to the employees of the Smithsonian Institution and its branches and to the visiting public, of the recently reorganized reading and reference room, with its loan and information desk, in the Arts and Industries Building. In the course of the year the assistant in charge, besides performing her other duties, recorded 700 visitors, answered more than 200 inquiries for information, some involving a good deal of research, and loaned nearly 3,000 books and periodicals.

Because of the amount and urgency of the current work and the smallness of the staff, only a little time was found during the year for the further revision of the catalogue, the completing of the shelf list, or the solving of the major problems that are calling for attention in the sectional libraries. Time was found, however, for supplying many of the publications needed by these libraries, pre-

paring their volumes for binding, and doing several other pieces of work for them, notably in the sections of botany, geology, and mammals. These libraries number 36, and are as follows:

Administration.
Administrative assistant's office.
American archeology.
Anthropology.
Biology.
Birds.
Botany.
Echinoderms.
Editor's office.
Ethnology.
Fishes.
Foods.
Geology.
Graphic arts.
History.
Insects.
Invertebrate paleontology.
Mammals.
Marine invertebrates.
Mechanical technology.
Medicine.
Minerals.
Mineral technology.
Mollusks.
Old World archeology.
Organic chemistry.
Paleobotany.
Photography.
Physical anthropology.
Property clerk's office.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.
Wood technology.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY

During the year the library of the Bureau of American Ethnology became a division of the Smithsonian library. This collection consists almost exclusively of works on anthropology, particularly those pertaining to the American aborigines, covering especially the linguistics, history, archeology, myths, religion, arts, sociology, and general culture of the American Indian. The library also has files of manuscript material, photographs, and Indian vocabularies. It was increased during the last year by 591 volumes and 200 pamphlets, and now contains 28,512 volumes and 16,377 pamphlets. The staff prepared 418 volumes for binding, and made considerable progress toward providing Library of Congress cards for the catalogue.

ASTROPHYSICAL OBSERVATORY LIBRARY

The library of the Astrophysical Observatory, which is kept partly in the observatory and partly in the main hall of the Smithsonian Building, is an important instrument in the astrophysical and meteorological work of the Institution, being of particular value just now in connection with its researches in solar radiation. It consists of 3,868 volumes and 2,949 pamphlets, of which 101 volumes and 224 pamphlets were added during the last year. The number of volumes bound was 64.

RADIATION AND ORGANISMS LIBRARY

Late in the year a new division of the Smithsonian library was established to meet the needs of the Institution's work in radiation and organisms. A list of the significant books and periodicals in the field was prepared, in cooperation with the chief of the bureau, and effort will be made immediately to obtain, by exchange or purchase, those that can not be borrowed from other units of the library.

LANGLEY AERONAUTICAL LIBRARY

The Langley aeronautical library, while consisting of only 1,697 volumes and 838 pamphlets, is one of the most prominent divisions of the Smithsonian library, as it contains many rare items, including complete files of the early aeronautical magazines. Some of these were in the original collection as it came from Samuel Pierpont Langley, the third secretary of the Institution, in whose memory the library was named. Others were among the publications given since by Alexander Graham Bell, Octave Chanute, and James Means. The library also has a large number of photographs, letters, and newspaper clippings. It is consulted continually by experts from the departments of the Government, from the embassies in Washington, and from aeronautical and other organizations in different parts of the country. The library was increased during the past year by 85 volumes and 138 pamphlets. The new catalogue, which had been begun the year before, was finished and the collection labeled and rearranged.

NATIONAL GALLERY OF ART LIBRARY

The library of the National Gallery of Art, which for the present is housed, with the gallery, in the Natural History Building, comprises 1,001 volumes and 1,106 pamphlets, chiefly on the art of the United States and Europe. The collection has been chosen with great care and has been slowly increased as funds and space permitted, with a view to becoming the nucleus of a much larger and more representative working library when the special building now in prospect for the gallery is provided. During the last year 153 volumes and 82 pamphlets were added to the collection and 33 volumes were bound. Most of the accessions came, as usual, by purchase and exchange, but many came by gift, notably from Dr. William H. Holmes, director of the gallery.

FREER GALLERY OF ART LIBRARY

The library of the Freer Gallery of Art concerns itself almost entirely with the interests represented by the collections of art objects pertaining to the arts and cultures of the Far East, India,

Persia, and the nearer East; by the life and works of James McNeill Whistler and of certain other American painters whose pictures are owned by the gallery; and, further, to a limited extent, by the Biblical manuscripts of the fourth and fifth centuries, which, as the possession of the Freer Gallery, are known as the Washington Manuscripts. It contains many works in the Chinese and Japanese languages, some of which are very rare, and thus supplements for research purposes the oriental division of the Library of Congress. During the year just closed the library was increased by 345 volumes and 191 pamphlets. Of these, 114 volumes were added to the collection designed for the use of the field staff of the gallery. This collection now numbers about 814 volumes and 500 pamphlets, while the main library totals 4,269 volumes and 2,769 pamphlets. Two of the noteworthy accessions were Sir Aurel Stein's Innermost Asia and a copy of the Codex Argenteus Upsaliensis, the latter of which was received as a gift by the Smithsonian Institution from the University of Upsala and assigned to the library of the gallery as a fitting addition to the Biblical material already on its shelves. Among the visitors there was the usual large number of readers and students, some of whom came to study the facsimiles of the Washington Manuscripts, and others to make drawings or tracings from material in the library. The number of volumes bound was 82.

NATIONAL ZOOLOGICAL PARK LIBRARY

The library of the National Zoological Park, which is kept in the administration building at the park, is the immediate working collection of the director and his assistants. It consists of about 1,209 volumes and 400 pamphlets, chiefly on animals and the care of them. The number of accessions for the year was 9 volumes and 100 pamphlets, and of volumes bound, 5.

SUMMARY OF ACCESSIONS

The accessions for the year may be summarized as follows:

Library	Volumes	Pamphlets and charts	Total
Astrophysical Observatory	101	224	325
Bureau of American Ethnology	591	200	791
Freer Gallery of Art	345	191	536
Langley aeronautical	85	138	223
National Gallery of Art	153	82	235
National Zoological Park	9	100	109
Radiation and organisms			
Smithsonian deposit, Library of Congress	3,569	5,928	9,497
Smithsonian office	144	16	160
United States National Museum	2,247	748	2,995
Total	7,244	7,627	14,871

The estimated number of volumes, pamphlets, and charts in the Smithsonian library on June 30, 1929, was as follows:

Volumes	563,106
Pamphlets	180,475
Charts	24,972
Total	768,553

This number does not include the many thousands of volumes in the library still uncatalogued or awaiting completion.

THE UNION CATALOGUE

Considerable progress was made during the year on the union catalogue of the libraries in the Smithsonian system, and that, too, despite the fact that the catalogue department was very much undermanned. In addition to doing the current work in the different libraries, the staff finished cataloguing the Langley aeronautical collection. It will next take up the John Donnell Smith and Watts de Peyster collections. It will also make a special effort to complete the shelf list in the library of the National Museum. The following statistics show the work of the year in detail:

Volumes catalogued	2,199
Volumes recatalogued	907
Pamphlets catalogued	2,080
Pamphlets recatalogued	3,676
Charts catalogued	316
Charts recatalogued	2
Typed cards added to catalogue	8,490
Library of Congress cards added to catalogue	22,961

PHYSICAL CONDITION AND EQUIPMENT

Mention was made in the librarian's last report of the improved physical condition and equipment of the reading room in the Arts and Industries Building. Since that report appeared there has been a similar improvement in two other units of the library. In the Natural History Building the three rooms used for library purposes were painted, new lights and ventilators were installed, a cork runner was laid the full length of the reference and stack rooms, and the two large awkward reading tables were converted into four attractive small ones. In the Smithsonian Building the five library rooms were painted and new shades provided for the windows, and several ranges of steel shelving were purchased for the catalogue room.

SPECIAL ACTIVITIES

Among the special activities of the year several should be mentioned.

Further progress was made in organizing the scientific material in the west stacks of the main building, so that by the close of the year most of it was in order. The finishing of this long, difficult task will greatly facilitate the exchange work of the library. Already many hundreds of publications have been found that were needed by sets in the various libraries of the Institution.

As a result of the work in the west stacks about 1,900 publications of a miscellaneous character, many in Japanese and Russian, were sent to the Smithsonian deposit and the document division of the Library of Congress.

The work of selecting from the Smithsonian duplicates items to be used in exchange with other libraries for material needed by the Institution was considerably advanced. In this connection 2,400 publications were sent to Harvard University and 2,900 to Yale. Other sendings will soon be made to Chicago University, Catholic University, and the Marine Biological Laboratory at Woods Hole.

Nearly 1,800 publications of State geological surveys were assembled from various unorganized collections in the Smithsonian Building and the Arts and Industries Building and many of them used toward completing sets in the library. Those not needed will be offered to the library of the Geological Survey.

About 10,000 publications of State agricultural experiment stations, which had been received and shelved by the library for many years, but which had little to do with the work of the Institution or its branches, were given to the library of the Department of Agriculture.

A collection of 667 reprints was sorted according to subject and distributed to the curators concerned.

The cards of the Wistar Institute were filed to date, and the Concilium Bibliographicum cards pertaining to mammals were deposited in the section of mammals.

The popular and semipopular material that, pending final disposal, had been stored in the basement of the Smithsonian Building, was transferred to a special building on the grounds of the Astrophysical Observatory and arranged.

The work of reorganizing the east stacks of the main building was begun, to make room for the growth of the reference department of the Institution and of the library of the Bureau of American Ethnology.

Special attention was given by the accessions department to the want cards from the Smithsonian deposit and the library of the National Museum, with the result that the correspondence based upon them will be brought up to date within a few weeks.

CONCLUSION

Finally, it is gratifying to report that the special allotment of $500 for expenses, made the past year for the first time, enabled the library to purchase important books, periodicals, and equipment for the office library that it could not otherwise have obtained. During the year to come the amount that will be available for books and periodicals for the Museum will be increased by $500. This will be pleasant news to the curators, who have been waiting patiently for the time when it would be possible for the library to get more of the publications essential to their work that can not be secured by exchange.

Among the needs of the library the most urgent is that of funds to establish permanent positions for two more cataloguers, another library assistant, a correspondence clerk, a stenographer, a typist, and another messenger. It is hoped that at least several of these positions can be provided for by the close of the next fiscal year, in order that the unfinished tasks that the library has inherited from the past, its current work, which is increasing steadily, and its new projects, may be expedited.

Respectfully submitted.

William L. Corbin,
Librarian.

Dr. Charles G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 11

REPORT ON THE PUBLICATIONS

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and the Government bureaus under its its administrative charge during the year ending June 30, 1929:

The Institution proper published during the year 16 papers in the series of Smithsonian Miscellaneous Collections, 1 annual report, and pamphlet copies of the 27 articles contained in the report appendix, and 5 special publications. The Bureau of American Ethnology published 3 annual reports and 5 bulletins. The United States National Museum issued 1 annual report, 2 volumes of proceedings, 4 complete bulletins, 1 part of a bulletin, 2 parts in the series Contributions from the United States National Herbarium, and 59 separates from the proceedings.

Of these publications there were distributed during the year 197,573 copies, which included 64 volumes and separates of the Smithsonian Contributions to Knowledge, 31,121 volumes and separates of the Smithsonian Miscellaneous Collections, 26,709 volumes and separates of the Smithsonian annual reports, 3,773 Smithsonian special publications, 115,128 volumes and separates of the various series of the National Museum publications, 20,112 publications of the Bureau of American Ethnology, 177 publications of the National Gallery of Art, 47 volumes of the Annals of the Astrophysical Observatory, 16 reports of the Harriman Alaska expedition, and 352 reports of the American Historical Association.

SMITHSONIAN MISCELLANEOUS COLLECTIONS

Of the Smithsonian Miscellaneous Collections, volume 73, 2 papers were issued; volume 75, 1 paper and title-page, table of contents, and index; and of volume 81, 13 papers, as follows:

VOLUME 73

No. 5. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 98 to 104. September 19, 1928. 28 pp. (Publ. 2973.)

No. 6. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 105 to 114. June 8, 1929. 26 pp. (Publ. 3016.)

VOLUME 75

No. 5. Cambrian Geology and Paleontology, V. No. 5. Pre-Devonian Paleozoic Formations of the Cordilleran Provinces of Canada. By Charles D. Walcott. September 14, 1928. Pp. 175–368, pls. 26–108, text figs. 24–35.
Title-page, table of contents and index. (Publ. 2976.)

VOLUME 81

No. 1. Mexican Mosses Collected by Brother Arsène Brouard—II. By I. Thériot. August 15, 1928. 26 pp., 9 text figs. (Publ. 2966.)

No. 2. Cambrian Fossils from the Mohave Desert. By Charles E. Resser. July 5, 1928. 10 pp., 3 pls. (Publ. 2970.)

No. 3. Morphology and Evolution of the Insect Head and Its Appendages. By R. E. Snodgrass. November 20, 1928. 158 pp., 57 text figs. (Publ. 2971.)

No. 4. Drawing by Jacques Lemoyne De Morgues of Saturioua, a Timucua Chief in Florida, 1564. By David I. Bushnell. August 23, 1928. 9 pp., 1 pl., 1 text fig. (Publ. 2972.)

No. 5. The Relations Between the Smithsonian Institution and the Wright Brothers. By Charles G. Abbot. September 29, 1928. 27 pp. (Publ. 2977.)

No. 6. A Study of Body Radiation. By L. B. Aldrich. December 1, 1928. 54 pp., 9 text figs. (Publ. 2980.)

No. 7. Recent Archeological Developments in the Vicinity of El Paso, Tex. By Frank H. H. Roberts, jr. January 25, 1929. 14 pp., 5 pls., 8 text figs. (Publ. 3009.)

No. 8. Parasites and the Aid They Give in Problems of Taxonomy, Geographical Distribution, and Paleogeography. By Maynard M. Metcalf. February 28, 1929. 36 pp. (Publ. 3010.)

No. 9. A Second Collection of Mammals from Caves Near St. Michel, Haiti. By Gerrit S. Miller, jr. March 30, 1929. 30 pp., 10 pls. (Publ. 3012.)

No. 10. Tropisms and Sense Organs of Lepidoptera. By N. E. McIndoo. April 4, 1929. 59 pp., 16 text figs. (Publ. 3013.)

No. 11. Atmospheric Ozone: Its Relation to Some Solar and Terrestrial Phenomena. By Frederick E. Fowle. March 18, 1929. 27 pp., 13 text figs. (Publ. 3014.)

No. 12. Archeological Investigations in the Taos Valley, N. Mex., during 1920. By J. A. Jeancon. June 11, 1929. 29 pp., 15 pls., 14 text figs. (Publ. 3015.)

No. 13. Descriptions of Four New Forms of Birds from Hispaniola. By Alexander Wetmore. May 15, 1929. 4 pp. (Publ. 3021.)

SMITHSONIAN ANNUAL REPORTS

Report for 1927.—The complete volume of the Annual Report of the Board of Regents for 1927 was received from the Public Printer in October, 1928.

Annual Report of the Board of Regents of the Smithsonian Institution showing operations, expenditures, and condition of the Institution for the year ending June 30, 1927. xii+580 pp., 99 pls., 44 text figs. (Publ. 2927.)

The appendix contained the following papers:

The Accomplishments of Modern Astronomy, by C. G Abbot.
Recent Developments of Cosmical Physics, by J. H. Jeans.
The Evolution of Twentieth-Century Physics, by Robert A. Millikan.
Isaac Newton, by Prof. Albert Einstein.

The Nucleus of the Atom, by J. A. Crowther
The Centenary of Augustin Fresnel, by E. M. Antoniadi.
Soaring Flight, by Wolfgang Klemperer.
The Coming of the New Coal Age, by Edwin E. Slosson.
Is the Earth Growing Old? By Josef Felix Pompeckj.
Geological Climates, by W. B Scott.
Geologic Romance of the Finger Lakes, by Prof. Herman F. Fairchild.
Fossil Marine Faunas as Indicators of Climatic Conditions, by Edwin Kirk.
Paleontology and Human Relations, by Stuart Weller.
At the North Pole, by Lincoln Ellsworth.
Bird Banding in America, by Frederick C. Lincoln.
The Distribution of Fresh-water Fishes, by David Starr Jordan.
The Mind of an Insect, by R E. Snodgrass.
The Evidence Bearing on Man's Evolution, by Aleš Hrdlička.
The Origins of the Chinese Civilization, by Henri Maspero.
Archeology in China, by Liang Chi-Chao.
Indian Villages of Southeast Alaska, by Herbert W. Krieger.
The Interpretation of Aboriginal Mounds by Means of Creek Indian Customs, by John R. Swanton.
Friederich Kurz, Artist-Explorer, by David I. Bushnell, jr.
Note on the Principles and Process of X-Ray Examination of Paintings, by Alan Burroughs.
Lengthening of Human Life in Retrospect and Prospect, by Irving Fisher.
Charles Doolittle Walcott, by George Otis Smith.
William Healey Dall, by C. Hart Merriam.

Report for 1928.—The report of the executive committee and proceedings of the Board of Regents of the Institution and the report of the secretary, both forming parts of the annual report of the Board of Regents to Congress, were issued in December, 1928.

Report of the executive committee and proceedings of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1928. 14 pp. (Publ. 2979.)
Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1928. 147 pp. (Publ. 2978.)

The general appendix to this report, which was in press at the close of the year, contains the following papers:

The Wider Aspects of Cosmogony, by J. H. Jeans.
The Stars in Action, by Alfred H. Joy.
Island Galaxies, by A. Vibert Douglas.
Astronomical Telescopes, by F. G. Pease.
New Results on Cosmic Rays, by R. A. Millikan and G. H. Cameron.
Three Centuries of Natural Philosophy, by W. F. G. Swann.
The Hypothesis of Continental Displacement, by C. Schuchert.
On Continental Fragmentation and the Geologic Bearing of the Moon's Surficial Features, by Joseph Barrell.
The "Craters of the Moon" in Idaho, by H. T. Stearns.
The Oldest Known Petrified Forest, by W. Goldring.
Water Divining, by J. W. Gregory.
Some Problems of Polar Geography, by R. N. Rudmose Brown.
Birds of the Past in North America, by Alexander Wetmore.

Mammalogy and the Smithsonian Institution, by Gerrit S. Miller, jr.

The Controversy Over Human "Missing Links," by Gerrit S. Miller, jr.

What is known of the Migrations of Some of the Whalebone Whales, by Remington Kellogg.

Ecology of the Red Squirrel, by A. Brooker Klugh.

Adventures of a Naturalist in the Ceylon Jungle, by Casey A. Wood.

Communication Among Insects, by N. E. McIndoo.

Our Insect Instrumentalists and Their Musical Technique, by H. A. Allard.

The Neanderthal Phase of Man, by Aleš Hrdlička.

Indian Costumes in the United States National Museum, by H. W. Krieger.

Mounds and Other Ancient Earthworks of the United States, by David I. Bushnell, jr.

Geocronology, by Gerard de Geer.

The Physiology of the Ductless Glands, by N. B. Taylor.

Arrhenius Memorial Lecture, by Sir James Walker.

Theodore William Richards, by Gregory P. Baxter.

SPECIAL PUBLICATIONS

Explorations and Field Work of the Smithsonian Institution in 1928. March 22, 1929. 198 pp., 173 text figs. (Publ. 3011.)

Classified list of Smithsonian Publications Available for Distribution, May 20, 1929. Compiled by Helen Munroe, 29 pp. (Publ. 3020.)

World Weather Records—Errata. By H. Helm Clayton. To accompany Smithsonian Miscellaneous Collections, volume 79. May 29, 1929. 28 pp. (Publ. 3019.)

REPRINTS

Handbook of the National Aircraft Collection. By Paul Edward Garber. Second edition, November, 1928. 32 pp., numerous illustrations.

Smithsonian Physical Tables. By Frederick E. Fowle. Seventh revised edition, fourth reprint, February 26, 1929. 458 pp. (Publ. 2539.)

Smithsonian Geographical Tables, By R. S. Woodward. Third edition, second reprint, August 17, 1929. 182 pp. (Publ. 854.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM

The editorial work of the National Museum is in the hands of Dr. Marcus Benjamin. During the year ending June 30, 1929, the Museum published 1 annual report, 2 volumes of proceedings, 4 complete bulletins, 1 part of a bulletin, 2 parts in the series Contributions from the United States National Herbarium, and 59 separates from the proceedings.

The issues of the bulletin were as follows:

Bulletin 100. Contributions to the Biology of the Philippine Archipelago and Adjacent Regions.

Volume 1. Papers on collections gathered by the *Albatross*, Philippine Expedition, 1907–1910.

Volume 8. The Fishes of the Series Capriformes, Ephippiformes, and Squamipennes, Collected by the United States Bureau of Fisheries Steamer *Albatross*, Chiefly in Philippine Seas and Adjacent Waters. By Henry W. Fowler and Barton A. Bean.

Bulletin 104. The Foraminifera of the Atlantic Ocean. Part 6. Miliolidae, Opthalmidiidae and Fischerinidae. By Joseph Augustine Cushman.

Bulletin 145. A Revision of the North American Species of Buprestid Beetles belonging to the Genus Agrilus. By W. S. Fisher.

Bulletin 146. Life Histories of North American Shore Birds. Order Limicolae (Part 2). By Arthur Cleveland Bent.

The issues of the Contributions from the United States National Herbarium were as follows:

Volume 26, part 3. Costa Rican Mosses collected by Paul C. Standley in 1924–1926. By Edwin B. Bartram.

Volume 28, part 1. The North American Species of Paspalum. By Agnes Chase.

Of the separates from the proceedings, 4 were from volume 73, 26 from volume 74, 25 from volume 75, and 4 from volume 76.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY

The editorial work has continued under the direction of the editor, Mr. Stanley Searles.

During the year three annual reports and five bulletins were issued.

Forty-first Annual Report. Accompanying papers: Coiled Basketry in British Columbia and Surrounding Region (Boas, assisted by Haeberlin, Teit, and Roberts); Two Prehistoric Villages in Middle Tennessee (Myer). 626 pp., 137 pls., 200 figs., 1 pocket map.

Forty-third Annual Report. Accompanying papers: The Osage Tribe; Two Versions of the Child-naming Rite (La Flesche); Wawenock Myth Texts from Maine (Speck); Native Tribes and Dialects of Connecticut, a Mohegan-Pequot Diary (Speck); Picuris Children's Stories (Harrington and Roberts); Iroquoian Cosmology—Second Part (Hewitt). 828 pp., 44 pls., 9 figs.

Forty-fourth Annual Report. Accompanying papers: Exploration of the Burton Mound at Santa Barbara, California (Harrington); Social and Religious Beliefs and Usages of the Chickasaw Indians (Densmore); Uses of Plants by the Chippewa Indians (Densmore); Archeological Investigations—II (Fowke). 555 pp., 98 pls., 16 figs.

Bulletin 84. Vocabulary of the Kiowa Language (Harrington). 255 pp., 1 fig.

Bulletin 86. Chippewa Customs (Densmore). 204 pp., 90 pls., 27 figs.

Bulletin 87. Notes on the Buffalo-head Dance of the Thunder Gens of the Fox Indians (Michelson). 94 pp., 1 fig.

Bulletin 89. Observations on the Thunder Dance of the Bear Gens of the Fox Indians (Michelson). 73 pp., 1 fig.

Bulletin 92. Shabik'eshchee Village: A Late Basket Maker Site in the Chaco Canyon, New Mexico (Roberts). 164 pp., 31 pls., 32 figs.

Publications in press are as follows:

Forty-fifth Annual Report. Accompanying papers: The Salishan Tribes of the Western Plateaus (Teit, edited by Boas); Tatooing and Face and Body Painting of the Thompson Indians, British Columbia (Teit, edited by Boas); The Ethnobotany of the Thompson Indians of British Columbia (Teit, edited by Steedman); The Osage Tribe; Rite of the Wa-xo-be (La Flesche).

Bulletin 88. Myths and Tales of the Southeastern Indians (Swanton).

Bulletin 90. Papago Music (Densmore).

Bulletin 91. Additional Studies of the Arts, Crafts, and Customs of the Guiana Indians, with special reference to those of Southeastern British Guiana (Roth).
Bulletin 93. Pawnee Music (Densmore).

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution and are communicated by him to Congress, as provided by the act of incorporation of the association.

The annual report for 1923 and the supplemental volume to the report for 1924 were issued during the year.

REPORT OF THE NATIONAL SOCIETY, DAUGHTERS OF THE AMERICAN REVOLUTION

The manuscript of the Thirty-first Annual Report of the National Society, Daughters of the American Revolution, was transmitted to Congress, in accordance with the law, December 6, 1928.

ALLOTMENTS FOR PRINTING

The congressional allotments for the printing of the Smithsonian Report to Congress and the various publications of the Government bureaus under the administration of the Institution were virtually used up at the close of the year. The appropriation for the coming year ending June 30, 1930, totals $95,000, allotted as follows:

Annual report to the Congress of the Board of Regents of the Smithsonian Institution	$11,500
National Museum	46,500
Bureau of American Ethnology	28,300
National Gallery of Art	500
International Exchanges	300
International Catalogue of Scientific Literature	100
National Zoological Park	300
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